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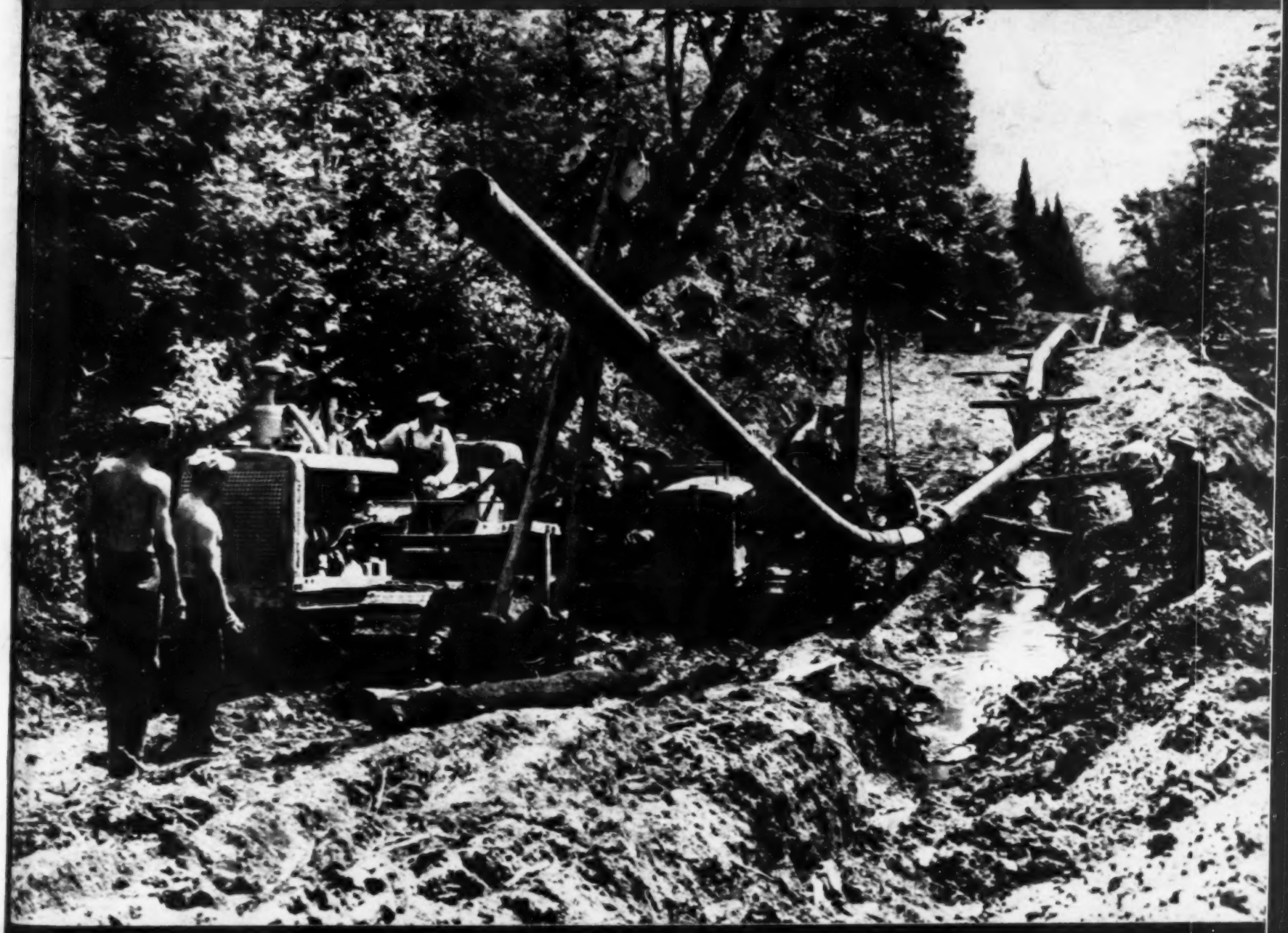
Construction Methods



238-Mile Pipe Line to carry oil from U. S. to Canada

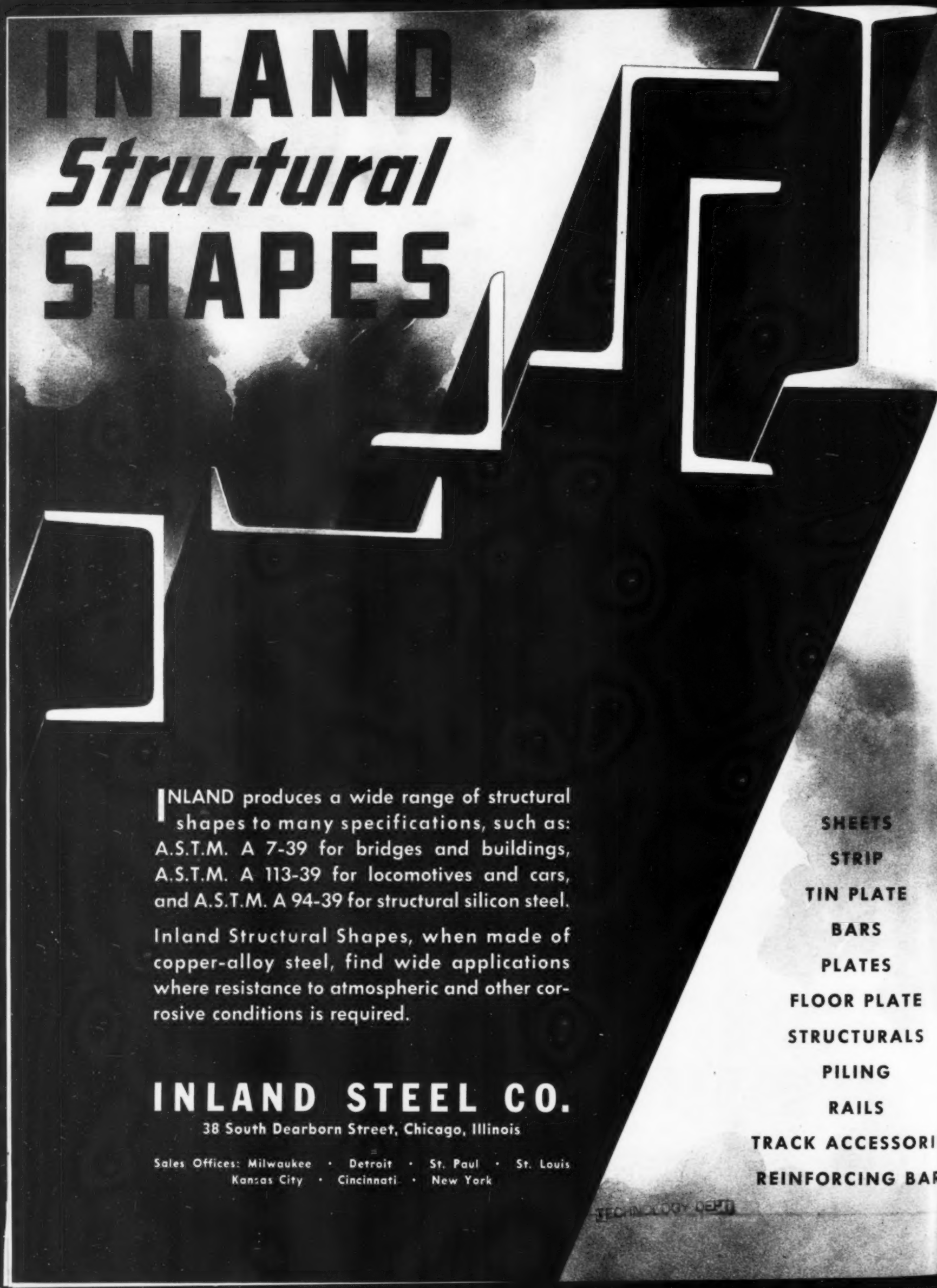
SEPTEMBER
1941

Oil Pipe Line Built
at 2-Miles-a-Day Rate

Drydock Concrete
Delivered by Conveyors

Site Assembly Speeds
Defense Housing

Aircraft Plant Has
200-Ft. Steel Trusses



INLAND produces a wide range of structural shapes to many specifications, such as: A.S.T.M. A 7-39 for bridges and buildings, A.S.T.M. A 113-39 for locomotives and cars, and A.S.T.M. A 94-39 for structural silicon steel.

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CURRENT JOBS

.... and Who's Doing Them

BUILDINGS

Public—Bryant & Detwiler Co., of Detroit, Mich., will build for the Ford Motor Co., of Dearborn, 1- and 3-story steel reinforced-concrete bomber plant for $31,961,300, to be financed by Defense Plant Corp. In St. Paul, Minn., War Department awarded $86,058,331 contract to **Federal Cartridge Corp.,** of Minneapolis, to design, construct, equip and operate Twin Cities ordinance plant. **Broderick & Gordon,** of Colorado Springs, Colo., received War Department contract to erect munitions plant in Salt Lake City, Utah, for $30,000,000 on cost-plus-fixed-fee basis. Successful bidders for War Department contract to construct plant for manufacture of small arms in Des Moines, Ia., were **Weitz Co.** and **McLaughlin Bros.,** of Des Moines, and **Central Engineering Co.** and **W. O. Priester Co.,** of Davenport, with bid of $30,000,000. Another War Department contract amounting to $29,000,000 went to **C. G. Kershaw Contracting Co.,** of Birmingham, Ala., for construction of 11 manufacturing plants, 4 chemical loading plants, depot, plant storage, laboratory shops, offices and hospital in Huntsville, Ala.

MacDonald Construction Co. and **G. L. Tarlton, Inc.,** of St. Louis, Mo., will build army cantonment, buildings, sewers, water supply, roads, etc., in Neosho, Mo., for War Department at cost of $23,000,000. In Sterlington, La., anhydrous ammonia plant is under construction by **M. W. Kellogg Co.,** of New York, for $16,750,000. Successful bidders for triangular division camp in Augusta, Ga., were **J. A. Jones Construction Co.,** of Charlotte, N. C., **Smith Pew Construction Co.,** and **MacDougald Construction Co.,** of Atlanta, with bid o $22,800,000. Bag-loading plant contract in Flora, Miss., was awarded to **Charles Weaver Construction Co. & Assoc.,** of Jackson, **S.&W. Co.,** of Memphis, Tenn., and **Eastern Construction Co.,** of Winston Salem, N. C., at estimated cost of $15,000,000. **Ford, Bacon & Davis,** of New York, will build for Jacob Aircraft Engine Co., in Pottstown, Pa., engine factory at estimated cost of $10,000,000, including equipment; Defense Plant Corp. will finance. In Voorheesville, N. Y., **Duffy Construction Corp. and Carleton Co., Inc.,** of New York, will erect general depot and traffic regulation station for $5,044,160. **Brann & Stewart & Co.,** of Philadelphia, Pa., received contract to build general storage depot, including 6 warehouses, 6 miscellaneous structures, etc., in Marietta, Pa., at total cost of $5,044,600.

HEAVY CONSTRUCTION

In Jamestown, Ky., Wolf Creek Dam and appurtenant works will be constructed by **S. A. Healy Construction Co.,** of White Plains, N. Y., for $15,803,890. Contract to build Anderson Ranch Dam in Idaho was awarded to **Morrison-Knudsen Co.,** of Boise, **J. F. Shea Co., Winston Bros.,** and **Ford J. Twaits Co.,** of Los Angeles, Calif., with bid of $9,986,203. Navy Department awarded a $26,029,722 naval air station contract, in Alaska, to **Siems-Drake-Puget Sound Co.,** of Seattle, Wash. Low bidders for air depot contract in Rome, N. Y., were **Turner Construction Co.,** of New York, and **Louis Mayersohn,** of Albany, with bid of $10,000,000. **T. A. Loving & Associates,** of Goldsboro, N. C., received contract to build Marine Corps Air Base in Cherrypoint, N. C., at cost of $14,145,000. Aircraft base in South Weymouth, Mass., is under construction by **Barletta Construction Co.,** and **Sawyer Construction Co.,** of Boston, for $5,620,000.

In Paris, Tenn., a barrage balloon training center will be built by **Rock City Construction Co.,** and **T. M. Strider Co.,** of Hashville, at price of $5,254,968. In Los Angeles, Calif., **Consolidated Steel Corp.,** of that city, will build a $4,000,000 shipbuilding plant with own forces. **Carter-Halls-Aldinger Co., Ltd.,** of Toronto, Ont., will construct flying school in Moncton, N. B., Canada, for approximately $3,000,000. **G. F. Atkinson,** of San Francisco, and **W. E. Kier Construction Co.,** of San Diego, were awarded contract to build Keswick Dam, Kennett Div., in Calif., for $2,736,628.

HIGHWAYS AND BRIDGES

Among recent highway and bridge contract awards are the following: Alabama: $54,597 to **R. T. Smith,** of Atlanta, Ga. Arizona: $234,891 to **Lee Moor Construction Co.,** of El Paso, Tex. California: $335,393 to **Fredericksen & Westbrook,** of Sacramento. Connecticut: $447,000 to **L. G. De Felice,** of New Haven. Florida: $367,227 to **C. C. Moore Construction Co.,** of Panama City. Indiana: $869,620 to **Bontrager Construction Co.,** of Elkhart; $393,083 to **Feigel Construction Co.,** of Evansville. Kentucky: $579,076 to **White Consol, Inc.,** of Chicago, Ill., and **Breslin Construction Co.,** of Louisville. Massachusetts: $534,000 to **Daniel O'Connells Sons, Inc.,** of Holyoke. Mississippi: $538,252 to **F. S. Neely,** of Armory. New York: $1,093,953 to **Rusciano & Son Corp.,** of New York; $775,747 to **B. Turecamo Contracting Co.,** of Brooklyn; $576,784 to **C. P. Ward, Inc.,** of Rochester. North Dakota: $199,954 to **Peter Kiewit Sons Co.,** of Omaha, Neb. Pennsylvania: $688,313 to **Kaufman Construction Co.,** of Philadelphia; $455,603 to **H. R. Miller Co.,** of Lancaster.

Virginia Bridge Co., of Roanoke, Va., was awarded contract to build bridge over tailrace of Santee-Cooper project in South Carolina, at cost of $547,840. **Bowers Construction Co.,** of Raleigh, N. C., will build bridge over Santee River Swamp in South Carolina, for $498,899.

SEPTEMBER, 1941
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The HOW of it

For the benefit of readers concerned with the practical application of method or equipment the following references are to articles or illustrations in this issue that tell:

How **EXCAVATION OF SUB-BASEMENT** involving limited headroom was done with back-hoe. —p. 39
How **OIL PIPE LINE** 236 mi. long was built on 120-day schedule. —p. 42
How **TRACTOR-TRAILER OUTFIT** strung 40-ft. pipe lengths along trench. —p. 42
How **SIDE-BOOM HOIST** on tractor handled pipe for 236 mi. oil line. —p. 43
How **ALIGNMENT CLAMP** held pipe in position for welding.—p. 44
How **DIFFERENT BUILDING MATERIALS** were tested in experimental barracks construction. —p. 45
How **ARMY AIRFIELDS** employed soil-cement construction to speed progress. —p. 46
How **SOIL-CEMENT MIX** for airfield construction was made with rotary tiller. —p. 46
How **SHADOWLESS LIGHTING** was produced in modern drafting room. —p. 47
How **SITE ASSEMBLY** speeded home building for defense workers. —p. 48
How **JIG TABLES** aided fabrication of lumber for house construction. —p. 48
How **CONVEYOR LINE** carried roof rafters for bolt-hole drilling on mass housing project. —p. 49
How **CONCRETE FOR NAVY DRYDOCK** was delivered by belt conveyors and traveling bridge. —p. 52
How **SHUTTLE CONVEYOR** carried concrete to belt on movable steel bridge spanning drydock site. —p. 53
How **WELL POINTS** facilitated excavation of 55-ft.-deep pit in the dry. —p. 54
How **CONCRETE-LINED RISER PIPE** was placed in aqueduct shaft. —p. 54
How **BOTTOM-DUMP SKIP** on inclined runway delivered concrete to tall wall forms. —p. 55
How **WRINKLE BENDING** with oxyacetylene torch produced curves in pipe line. —p. 55
How **OVERHEAD LOADER** handled granite at quarry. —p. 55
How **ARMY AIR DEPOT** was completed on rapid schedule.—p. 56
How **MELTING ICE CAKES** lowered 11-ton gasoline tanks.—p. 59

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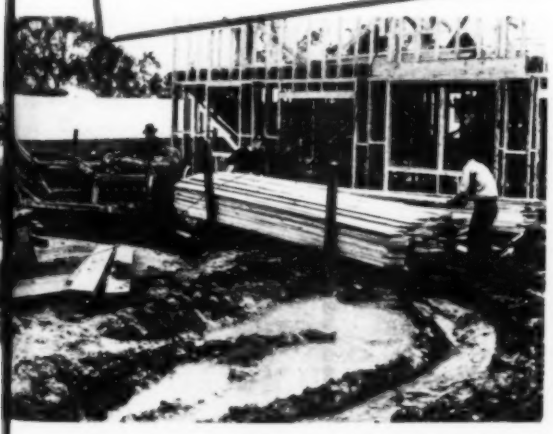

The going's muddy, but the International TD-6 moves lumber speedily on this housing project in Washington, D. C.

Up-to-date road building in a residential development near Philadelphia, with an International TD-18 Diesel TracTracTor and scraper.

Shaping a drainage ditch in Scott County, Mississippi, with an International TD-14 Diesel TracTracTor and 10-foot grader.

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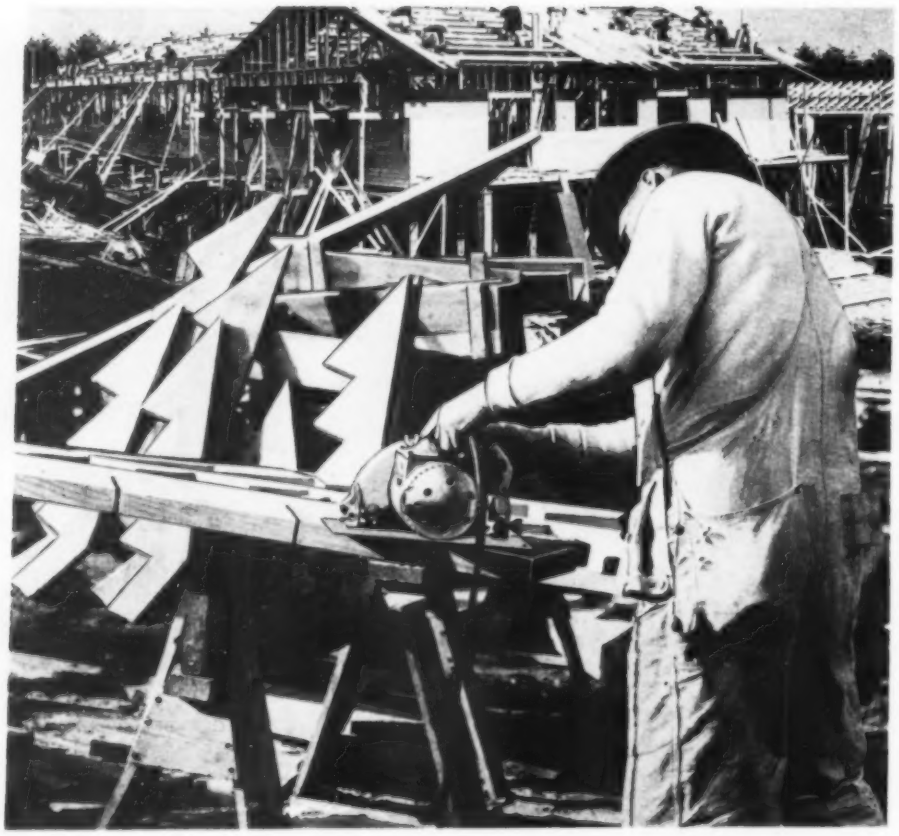

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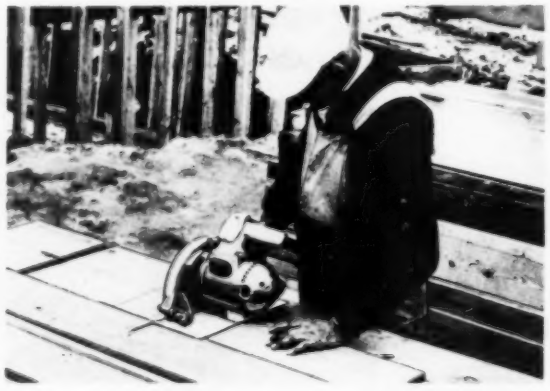

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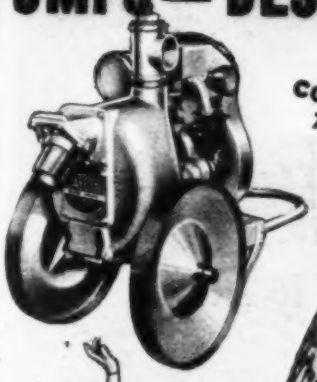

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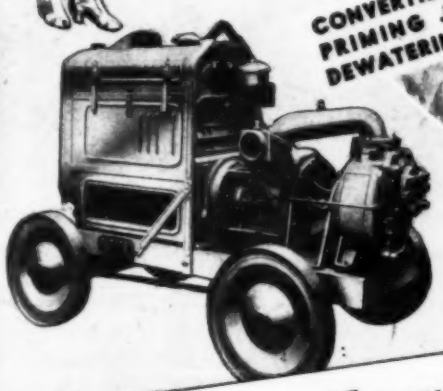

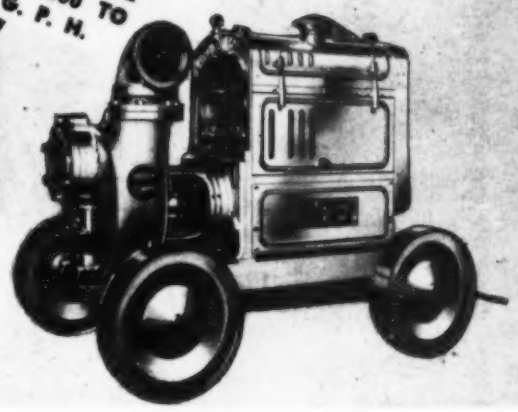

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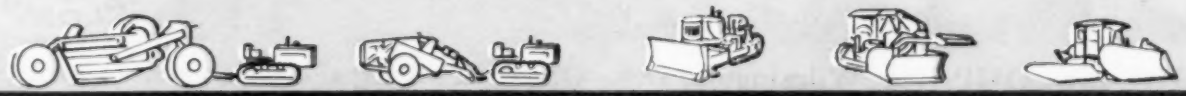
. . . one of the biggest operators in earthmoving business now has a total of nine LaPlant-Choate Carrimor Scrapers and many other LaPlant-Choate units. His scraper-foreman, Charlie Evans, says, "These scrapers are much easier on cable than any we have ever had. In fact, some of the original spools of cable that came on the Carrimors are still being used after 1800 hours of operation."

Write or phone your nearest LaPlant-Choate-Caterpillar dealer for information and booklets on LaPlant-Choate Equipment.

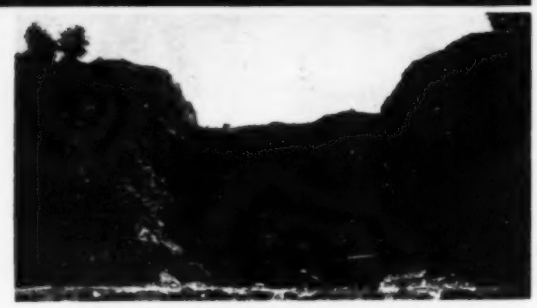
LaPLANT-CHOATE MANUFACTURING CO. Inc.

CEDAR RAPIDS, IOWA . . . . SAN LEANDRO, CALIF.



EARTH MOVING · · · · LAND CLEARING · · · · SNOW REMOVAL

The DEEPEST CUT in the Badger State



Well-drill shot—face before shooting

Well-drill shot—A blast! (note first lift at base)

. . . was taken out with ATLAS EXPLOSIVES

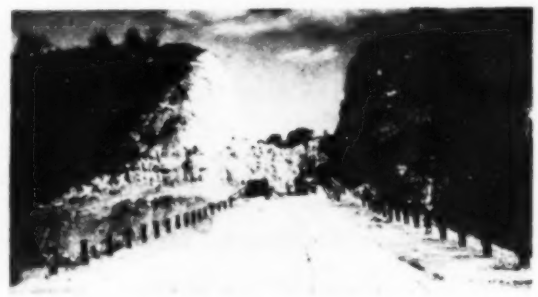
Driving from Hazel Green to East Dubuque, you pass through the deepest cut in Wisconsin—one that involved the removal of 85,000 cu. yds. of limestone with more than 90-foot banks on either side. That's a man-sized job in Wisconsin or anywhere else!

Credit goes to A. B. Lynch Co., the main contractors—to Edward Kraemer & Sons, sub-contractors—and we trust to Atlas Explosives and service for a neat job of "better blasting."

The entire cut was taken out in 12- to 15-foot lifts—except for four well-drill shots at the west end.

Ask your Atlas Representative to demonstrate how careful selection and proper use of explosives reduces excavation costs.

Fragmentation that makes for economical removal



Looking east—the last lift

ATLAS EXPLOSIVES *"Everything for Blasting"*

CHEMICALS ATLAS EXPLOSIVES

ATLAS POWDER COMPANY, Wilmington, Del. · Offices in principal cities · Cable Address—Atpowco

It will pay to PLAN AHEAD

to have a REAL ROCK SHOVEL

AS the defense ball of orders and construction grows, you need every advantage it is possible to get for speed—for profit!

The Northwest Welded Shovel Boom, the Dual Independent Crowd, the "feather-touch" Clutch Control, the Cushion Clutch, Uniform Pressure Swing Clutches, Differential Steering—Northwest exclusive features combined with other Northwest advantages give you an edge for those fast jobs that every one is shouting for today. *Now* is the time to make your purchases count for the future.

NORTHWEST ENGINEERING COMPANY
1728 Steger Building · 28 E. Jackson Boulevard · Chicago, Illinois

NORTHWEST

Shovels • Cranes • Draglines • Pullshovels

. . IF YOU HAVE A REAL ROCK SHOVEL YOU'LL NEVER HAVE TO WORRY ABOUT OUTPUT IN DIRT!

LICKING

WE DIDN'T have years to get ready for defense. We had months—and tough months too. Many of America's new training camps and airports, factory sites and naval bases had to be broken out of rock-hard frozen ground or waist-deep mud. The fact that so many of these jobs have been done *ahead of schedule* is a tribute to the world's most efficient earth-movers—American engineers and contractors and the machines they use so well.

"Caterpillar" Diesel Tractors, Engines and Motor Graders on defense projects moved more than 500 million cubic yards in the first six months of 1941 and they're hitting a still faster pace today.

The same rugged power, dependability and economy that have built "Caterpillar" leadership are making history in the present emergency. And the men in the "Caterpillar" plant are working day and night to supply the vital needs of the nation's defense.

CATERPILLAR TRACTOR CO., PEORIA, ILLINOIS

CATERPILLAR

REG. U.S. PAT. OFF.

DIESEL ENGINES AND ELECTRIC SETS
TRACK-TYPE TRACTORS • ROAD MACHINERY

• Six trips an hour on an 800-foot haul are made by the "Caterpillar" Diesel D8 Tractors with LaPlant-Choate Carrimor scrapers on this leveling job at Camp Clayton, Fort Ord, California. With the raw power to pull big payloads and stamina to keep going 20 hours a day, month after month, these "Caterpillar" Diesel D8s are recognized as the final word in dirt-moving efficiency.

AMERICA'S BIGGEST JOB

• At Camp Wolters, Mineral Wells, Texas, this "Caterpillar" Diesel No. 12 Motor Grader is going to town on a tough road-building job. Big-blade capacity due to unparalleled traction spreads heavy gravel or crushed rock easily. Among Army engineers and contractors alike, the No. 12 has won a reputation as the fastest working, strongest and most versatile motor grader available for today's punishing requirements.

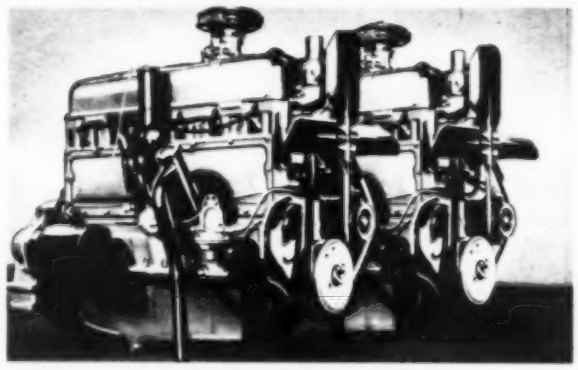
• Darkness doesn't stop defense work. On this earth-moving job in Georgia, powerful flood lights give the night shift every advantage of daylight operation. The "Caterpillar" Diesel Electric Set (15,000 watts) that furnishes current is a self-contained unit. With the light tower, it can be moved to any location on the job in a few minutes. It requires no complicated connections or supervision, and it produces electricity at rock-bottom cost.

Give a man a Truck that can Pull!

GMC TRUCKS OUTPULL ALL OTHERS
and they're priced with the very lowest

Give your drivers GMCs, and watch them set new records. Give them GMC pulling power, *unmatched in every engine size,* to boost their pace on all your routes. Give them GMC's greater flexibility, for easier handling in traffic. Give them GMCs—the trucks that outpull all others—and you'll enjoy the highest hauling standards and greatest economy any truck can offer.

Our own YMAC Time Payment Plan assures you of lowest available rates



2 POWERFUL ENGINES for 1½-TON GMCs

- *93 H. P. "228"—183.5 ft.-lbs. Max. Torque*
- *97 H. P. "236"—192.5 ft.-lbs. Max. Torque*

THE TRUCK OF VALUE

IF IT STEERS LIKE A TRUCK IT'S NOT A GMC

GMC TRUCKS

GASOLINE — DIESEL

can you tell how far he can jump ?

WICKWIRE ROPE

Neither can you tell from looking at Wickwire Rope how much more service it gives than usual high grade wire ropes. Use alone will prove it.

We invite this comparison. Install a Wickwire Rope of the design recommended by our representative. Use it to destruction. Then compare its per-unit-of-use cost with that of any other rope you have ever used. Our bid for your business is based upon your attaining lower rope costs.

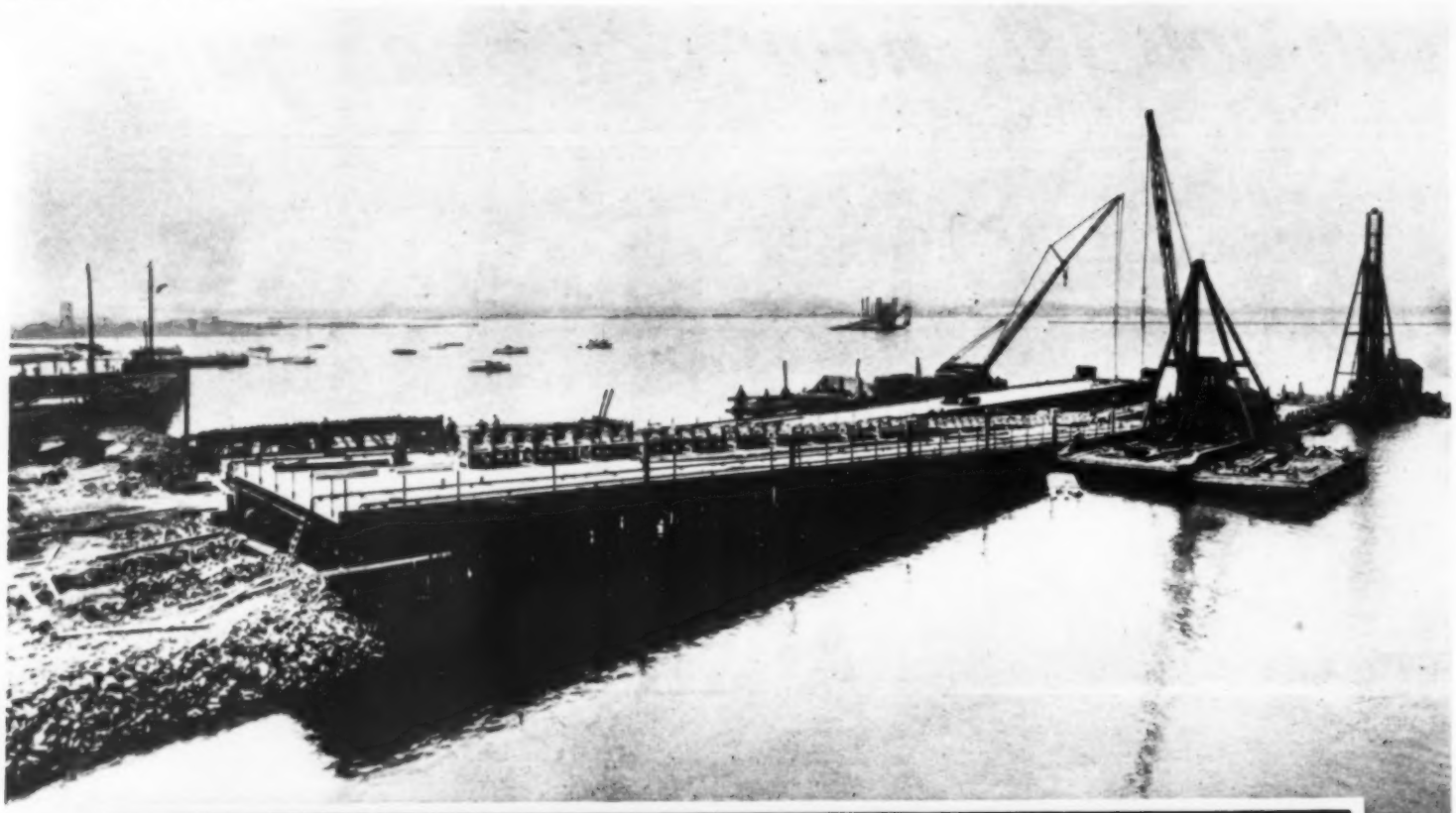
While Wickwire Rope is premium quality, its price-per-foot is no more than other recognized brands.

WICKWIRE SPENCER STEEL COMPANY

General Offices: 500 Fifth Avenue, New York City; Sales Offices and Warehouses: Worcester, New York, Chicago, Buffalo, San Francisco, Los Angeles, Tulsa, Chattanooga, Houston, Abilene, Texas, Seattle. Export Sales Department: New York City

• **SHIPWAY AND PIER,** U. S. Navy, New York Harbor

• **CONTRACTOR:** Geo. W. Rogers Construction Corp., New York City



Time is more than money ... *these days!*

Every hour saved getting a defense project into operation increases the national safety.

That is why the Geo. W. Rogers Construction Corp. was out to finish this pier and shipway in N. Y. Harbor as far ahead of schedule as could be done. For here destroyers are to be built.

One of the reasons why the contractor beat his scheduled completion by 28 days was 1200 barrels of Lehigh Early Strength Cement. The shipway and pier "floor" slabs were ready for traffic within 24 hours after the concrete was poured. Continuous construction could be maintained; the saving of precious hours was inevitable.

The middle of March saw this contract awarded; June 1 saw the keel blocks for a destroyer laid.

Whether you are engaged on concrete work for defense or civilian projects, you should consider the cement that makes service-strength concrete in .one-third to one-fifth the usual time. The savings that Lehigh Early Strength Cement can make for you are *both* in time *and* money.

Lehigh

EARLY STRENGTH CEMENT

for service-strength concrete in a hurry

LEHIGH PORTLAND CEMENT COMPANY ALLENTOWN, PA. • CHICAGO, ILL. • SPOKANE, WASH.

To Long Haul Earthmovers

How TOURNAPULL 2-Wheel Design Increases Profit Possibilities

TOURNAPULL weight (plus 40% of the Carryall and its load) is centered where you need it—on the drive wheels—to give you the greatest possible tractive power. This power is more effective, too, because extra, load-robbing weight (required to keep ordinary steering wheels on the ground) is eliminated in the Tournapull by discarding front steering wheels—you steer and pull with the same wheels, just as you do with tracks on a track-type tractor. The 2-wheel design enables us to put tires of larger diameter and greater cross-section on Tournapulls than are found on any other comparable self-propelled unit. Result: tractive effort is spread over a greater ground area . . . you get more flotation, lighter draft, can work profitably over a wider range of conditions and in higher gears. Thus you get more work, more yardage and higher average speeds from the same horsepower in Tournapulls.

Today more than 300 Tournapulls are in everyday operation, making money on long hauls for successful earthmovers in 30 states, Canada, Mexico, South America, Phillippines, Malay States and British Isles. They'll do the same for you. See your LeTourneau-"Caterpillar" dealer . . . ask him to send in your Tournapull order NOW.

Here on A. B. Burton Company's highway relocation job near Knoxville, Tenn., two "Caterpillar" powered C Tournapulls moved 1600 cubic yards in 12 hours on a round trip varying from 2500 to 3200 feet. Average cycle time—5.3 minutes; average loading time (with pusher —.86 minutes.

Note to Operators

Tournapulls are simple to operate—they shift like a truck, steer like a track-type tractor. There are no front wheels to bog down when traveling or turning in mud or sand. Two-wheel design enables you to turn faster and sharper. Big brakes on both Tournapull and Carryall assure quick stopping and complete control on grades. Tournapull Carryall loading and spreading are controlled by same type positive, easy-acting LeTourneau Power Control Unit used today on thousands of track-type tractors.

You Can Expect These Profit-Making Yardages from TOURNAPULLS

Loading common earth on the level with a "Caterpillar" D8 pusher and hauling over good roadways, you can expect the following yardages in a 60-minute hour from Tournapulls:

Haul—One Way	Model C (11 yards heaped)		Super C (15 yards heaped)	
	Trips	Pay Yards	Trips	Pay Yards
1200	13.3	113	12.0	144
1600	11.8	100	10.7	129
2000	10.5	89	9.7	116
3000	8.1	69	7.6	91
5000	5.7	49	5.4	65

LETOURNEAU

PEORIA, ILLINOIS · STOCKTON, CALIFORNIA

Cable Address: "BOBLETORNO"

For Lowest Net Cost per Yard-CARRYALL* SCRAPERS, ANGLEDOZERS*, POWER CONTROL UNITS, BULLDOZERS, ROOTERS*, TRACTOR CRANES, PUSHDOZERS, TOURNAPULLS*, SHEEP'S FOOT ROLLERS, TOURNATRAILERS*, TOURNACRANE. *Name Reg. U. S. Pat. Off.

VENTUBE* IS PRE-TESTED

HERE FOR EXTRA YEARS OF SERVICE HERE

NO WONDER "Ventube" flexible ventilating duct is so amazingly durable! It is made of only the finest extra-heavy, long fibered cloth woven to specific standards set up by the Du Pont testing laboratories. The fabric and even the thread that goes into the making of "Ventube" are then processed with a special chemical treatment to resist fungus growth. Next, this fabric is impregnated and then coated with a resilient composition on both sides to resist acid water, gases and moisture!

Rigid chemical control and high Du Pont standards assure you of getting the best ventilating results possible with "Ventube." It is balanced in strength in both the warp and the filler direction so it can withstand tearing and rupture. It is light-weight, flexible, and easy to handle. "Ventube" slides back quickly when blasting. Immediately afterwards it slides forward again, bringing clean, fresh air into your tunnel with only the aid of a motor-driven fan of proper capacity.

"Ventube" saves time . . . helps you speed up work and cut costs. Install a few sections in your toughest working. See for yourself how efficiently it works. We'll be glad to send you facts and figures. Write to-day for complete information!

DU PONT VENTUBE

THE FLEXIBLE VENTILATING DUCT

E. I. DU PONT DE NEMOURS & COMPANY (INC.)

"FABRIKOID" DIVISION · FAIRFIELD, CONN.

**"VENTUBE" is Du Pont's registered trade mark designating its rubber impregnated flexible ventilating duct.*

● This roomy, compact powder bag is made of the same sturdy material as is "Ventube." The seams are sewed as tough as rawhide—and the fabric is coated and impregnated with thick, resistant rubber. Du Pont powder bags are available in several sizes. Write for sizes and prices.

HERCULES ENGINE PERFECT

..after 140,000-mile race against time!

HAVE YOU a herculean Diesel job? One where you MUST hit the ball day after day—one where costs must be kept 'way down . . . then see how RPM DELO helped the Northwest Film Service of Seattle:

Their job is to distribute films on a lightning-fast schedule—mile after mile—week after week—across rugged mountain ranges—all over the State of Washington. And *do* it at the gruelling rate of 10,000 miles a month—using one lone truck powered with a Hercules motor. Difficulties, now and then? Costly trouble? Not in 14 months! *Not in 140,000 miles!*

No wonder Fred J. Londry, executive of the film company, writes in! Yes, and he gives enthusiastic credit to his Hercules Diesel—and to RPM DELO that made this record performance possible!

So here's a tip—next time call for RPM DELO—the oil that ends ring, bearing and sludge trouble. Watch it cut costs.

ORDER RPM DELO *Unequaled* FOR YOUR DIESELS

Approved by the makers of over 95% of the installed Diesel horsepower in America, RPM DELO is marketed under the following names:

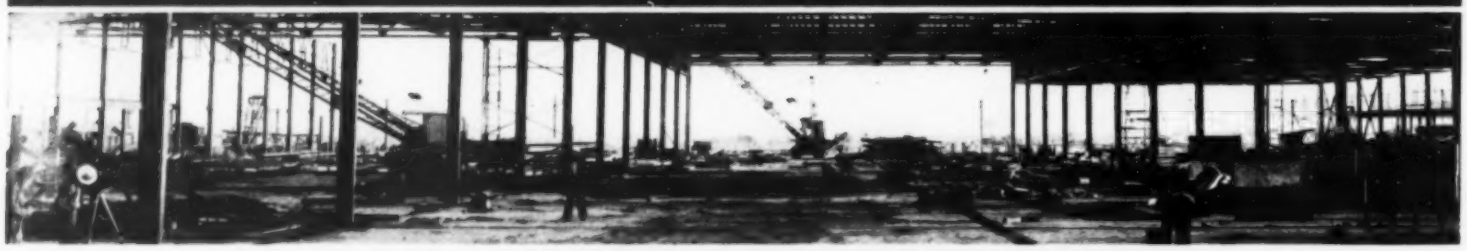
RPM DELO
Kyso RPM DELO • Sohio RPM DELO
Signal RPM DELO • Caltex RPM DELO
Imperial RPM DELO

Ask your Diesel engine manufacturer or distributor for the RPM DELO supplier in your locality.

STANDARD OIL COMPANY OF CALIFORNIA

WORLD'S LARGEST POUR

of Finished Cement Floor in Record Time!



P. J. Walker Company, Contractors. H. B. Rightmier, Project Manager. Frank Starr, Superintendent of Construction. A. B. Wheller, Resident Engineer. Ellis Wing Taylor and Edward Cray Taylor, Architects and Engineers. S. L. Martinez, Superintendent of Cement Finish.

"WHITEMAN" MACHINES finish 73,000 sq. ft. of 5 in. concrete floor in 12 hours and 15 minutes from time pour was started.

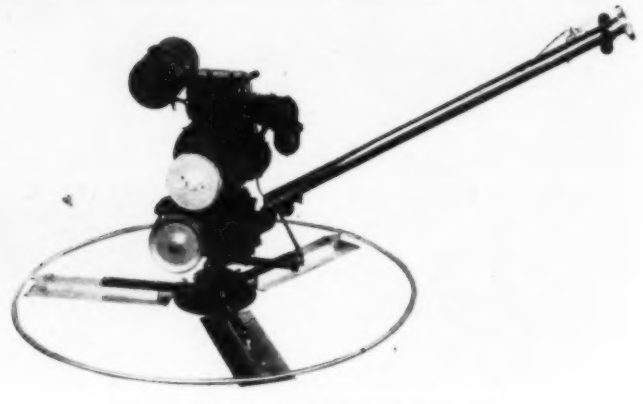
At the DOUGLAS AIRCRAFT plant, Long Beach, Calif., "WHITEMAN" machines finished all concrete floors for the P. J. Walker Co. Here is what Mr. Frank W. Starr, Superintendent of Construction, (who has finished over 1,500,000 sq. ft. of floor with "WHITEMAN" machines in the last four months), says about the performance of his "WHITEMAN" Finishers:

"This Float ('WHITEMAN' Cement Floor Finisher) performed exceptionally well, producing a very fine surface, and in addition to its excellent performance, cut the finishing costs . . . .

"On April 16, 1941, the mixing plant was started at 4:00 a.m. At 12:30 p.m. the plant was shut down and the pour finished. We put through 1234 cu. yd. of concrete, spreading an area of 73,000 sq. ft. of 5-in. concrete floor. At 4:15 p.m. the floor was finished completely. In view of the fact that the Master Builders Floor Hardener also was used in connection with the finish, it is my opinion that it would have been impossible to have finished that large area in this time without the aid of the Power Floats ('WHITEMAN' Finishers) and get the results we wanted — a level, hard finished floor."

Why not multiply the efficiency of your finishing crews with the "WHITEMAN" Precision Cement Floor Finisher? With either the gasoline or electric powered model you machine finish cement floors in minimum time — prevent even large areas from "getting away" from you. Results are: level, denser, more wear-resistant cement floors that will withstand every traffic requirement — AND AT LOWER COST.

Don't delay—Write NOW for the name of your nearest dealer.



"Whiteman" Cement Floor Finisher — Gasoline Model

Here's how the "WHITEMAN" Floor Finisher Assures Better Floors at Lower Cost—

1. High Speed Finishing—you can cover 1,000 sq. ft. of floor in 15 minutes.
2. Large areas can be handled quickly — 73,000 sq. ft. at Douglas Plant machine finished in 12 hours and 15 minutes from time pour was started.
3. Your finishing crews accomplish more, because "WHITEMAN" Finishers eliminate slow, tedious back-breaking hand labor.
4. Floors don't "get away from you" when extra finishers aren't available.
5. Harder, denser surface results from the weight of the machine which compacts material, avoids laitance and water voids.
6. Uniformly level floors are assured by the broad sweep of the 48-in. diameter rotating trowels.

"WHITEMAN" Hand Grill TAMPER

makes Dense, Hard Floors Without Dry Topping

Dry topping is unnecessary with a good concrete mix, when you prepare the slab with this Hand Grill Tamper. The "WHITEMAN" Tamper knocks heavier aggregates down—leaves a "fat" sufficient for finish.

You get a denser floor with more even distribution of finer aggregates on the surface, due to the Grill action. This inexpensive, lightweight, collapsible and adjustable Tamper saves time and money on all types of surfaces. Write for full information.

WHITEMAN
MANUFACTURING COMPANY
3244 Casitas Avenue
Los Angeles, California

KEEP MATERIALS MOVING
Under Any Ground Conditions

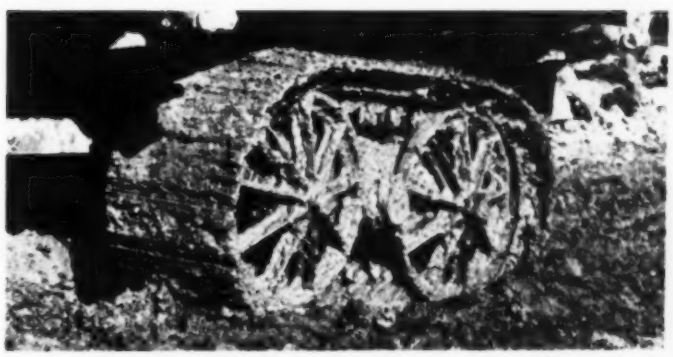
Pulled by "Caterpillar" Diesel Tractors, these Athey Trailers haul rocks to build grade for a new West Virginia highway.

● Athey Forged-Trak Trailers insure dependable off-the-pavement hauling under all ground and weather conditions. They enable you to maintain consistent speed because of their ability to operate efficiently over rock, muck or other adverse ground conditions.

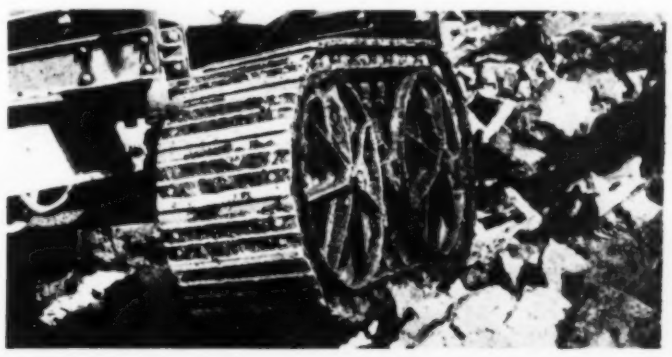
Steady, uninterrupted production means final low cost on any dirt-moving job.

See Your "Caterpillar" Dealer or Write:

ATHEY
TRUSS WHEEL CO.
5631 West 65th St., Chicago, Illinois
Cable Address: "*Trusswheel*", Chicago



By distributing weights over a wide track area, Athey Forged-Trak Wheels support heavy loads over soft mud.

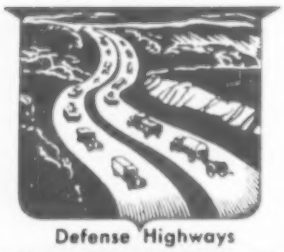


Athey Wheels roll over and tamp sharp fragments of blasted rock. Consequently, track-type equipment requires no high road maintenance cost to cut down profit.

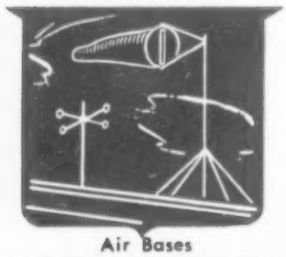
★ DEFENSE ★

Begins with Construction

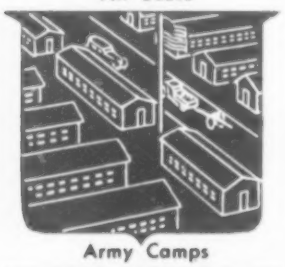
LINK-BELT SPEEDER



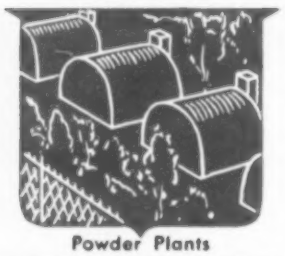
Defense Highways



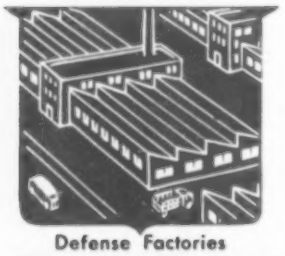
Air Bases



Army Camps



Powder Plants



Defense Factories

Ordnance Plants

★ American Industry has answered with a will the call to the front line of defense. Great factories all over the land are turning out, in constantly accelerating volume, munitions, airplanes, tanks, and the many other instruments of a mechanized warfare.

But all of this production could not have come about without the speed and efficiency of contractors and builders, who, with their modern excavating and construction machinery, are able to erect whole plants in weeks instead of months.

All over the nation, at new ordnance, ammunition and powder plants, air bases, army camps, naval bases, new military roads and many other defense projects, one finds Link-Belt Speeder shovels, draglines and cranes doing more than their share of vital defense work.

Link-Belt Speeder joins American industry, which it has so long served, in the firm resolve that "Government of the People, by the People, and for the People shall not perish from the earth."

8630

LINK-BELT SPEEDER CORPORATION, 301 W. PERSHING ROAD, CHICAGO

Builders of the Most Complete Line of Shovels and Cranes

What does American Bosch offer the builder or user of Diesel engines?

It offers the dependability of leadership..leadership in research, leadership in engineering.

And in addition it offers one vital thing more: Factory equipped service stations that Diesel users everywhere can depend on.

AMERICAN BOSCH CORPORATION
SPRINGFIELD, MASSACHUSETTS

AMERICAN BOSCH

Fuel Injection STANDARD OF AMERICA WORLD WIDE SERVICE *Equipment*

Calcium Chloride

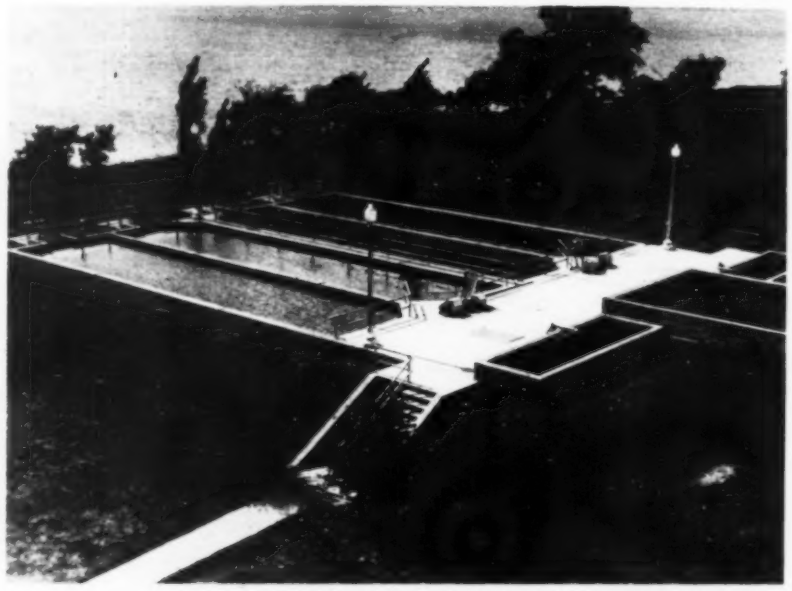
Used In The Mix To Speed Up and Protect Winter Construction of Sewage Plant

During winter construction of this most modern sewage disposal plant at Washington, D. C., specifications required the use of calcium chloride whenever temperatures were expected to reach 50° Fahrenheit or lower.

Research shows that concrete containing calcium chloride placed at air temperatures 44-48° acquired necessary stiffness for finishing in almost exactly the same time as plain concrete placed at ideal air temperature 70°. The addition of calcium chloride thus makes up for the lag in setting time which occurs when plain concrete is placed in cold weather. This acceleration of set shortens the time when cold weather protection and covering are necessary.

Concrete containing calcium chloride had 675 lbs. transverse strength at 3 days as against 415 lbs. for plain concrete—a gain of 63% in strength through use of calcium chloride. This high early strength gets concrete out of danger quickly.

Write for bulletins covering the use of calcium chloride in cold weather concreting and where speed and quality are important.



CALCIUM CHLORIDE ASSOCIATION
4145 PENOBSCOT BLDG. • DETROIT, MICHIGAN

CALCIUM CHLORIDE
YEAR 'ROUND CONCRETE CONSTRUCTION

The 40A SCORES a BULL'S-EYE on EVERY COUNT..

POWER

Horsepower travels at a gallop directly from motor to the Center Drive pinion and from there directly into hoist and swing (or travel) shafts. You can concentrate full engine power on any one operation or distribute it over simultaneous, synchronized operations for high speed performance.

STRENGTH

1 of 3 Loraines purchased by Nally & Mudd, Kentucky.

Center Drive results in utmost simplicity of design and that means fewer parts of greater strength. You don't have to pamper this machine because of size. It will dig anything that will go through the dipper.

CAPACITY

You can handle bigger pay loads per pound of weight with this ¾-yd. unit. Its patented Sloping Machinery Frame utilizes the machinery as "live counterweight" to obtain maximum lifting capacities.

UTILITY

This machine is a specialist in only one respect—moving more material, faster, at lower cost. As to type of boom equipment, take your pick of shovel, crane, dragline, clamshell, backdigger or skimmer. It handles them all with equal efficiency.

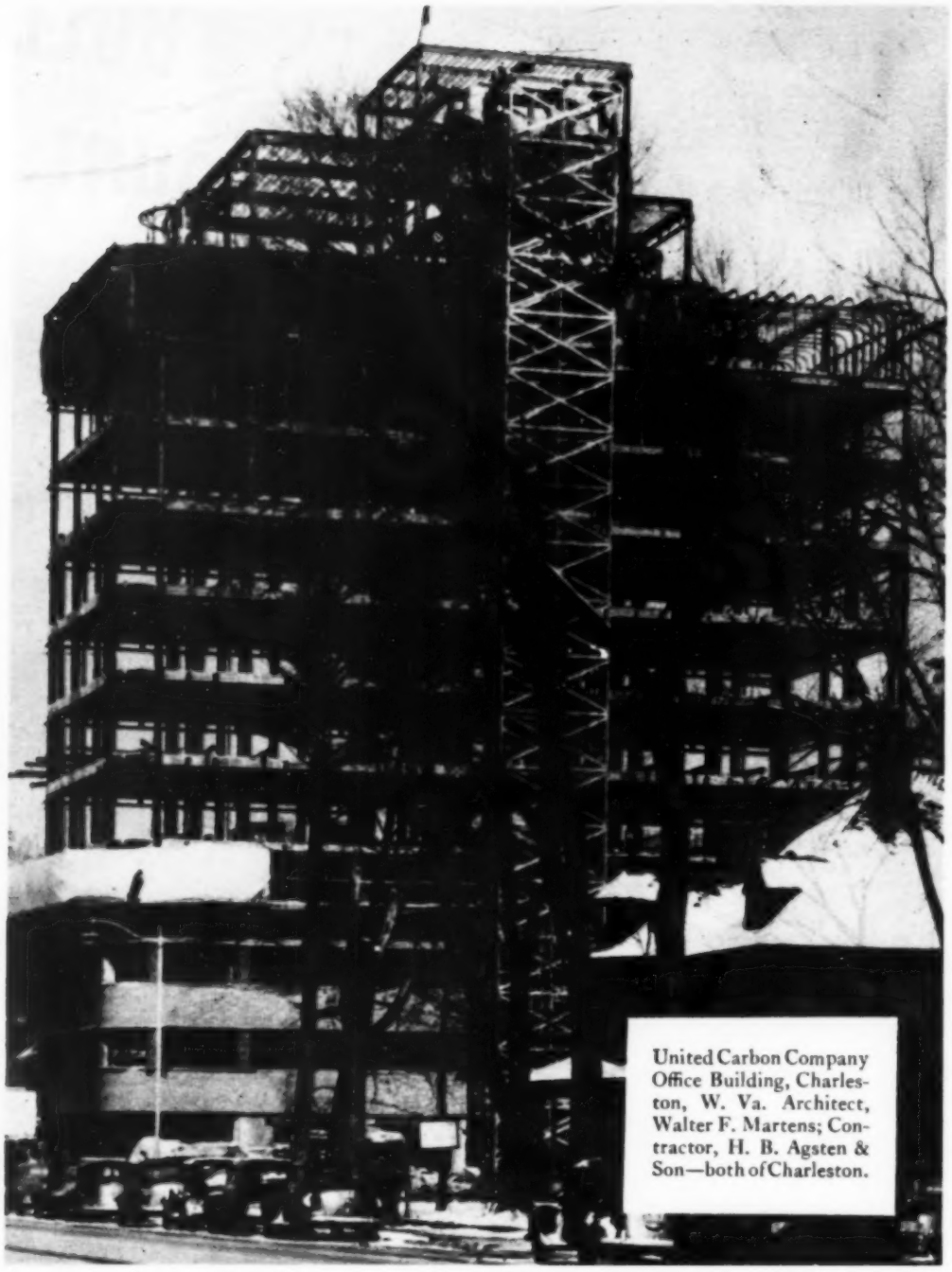
There's a copy of the new Lorain-40A bulletin that has your name on it. Write for it today.

UNIVERSAL CRANE DIVISION • THE THEW SHOVEL COMPANY, LORAIN, OHIO

THEW CENTER DRIVE

¾ YD. LORAIN-40A

SAVED 2 SETS OF FORMS— 72 DAYS



United Carbon Company Office Building, Charleston, W. Va. Architect, Walter F. Martens; Contractor, H. B. Agsten & Son—both of Charleston.

How Atlas High-Early cement helped to reduce costs and speed construction of this 12-story building

HERE'S a story of large savings in money and concreting time on this new office building. In reporting these savings after a careful study of his records, contractor H. B. Agsten & Son stated that Atlas High-Early cement helped in these ways:

TIME SAVED: 6 to 7 days concreting time on each floor. Total saving, 72 to 84 days!

FORMS SAVED: 2 complete sets of forms because Atlas High-Early cement permitted earlier stripping and reuse of forms.

FUEL COSTS: Saved $24 per floor for coke used to heat concrete during curing, a total of $288 on fuel.

Whenever speed in construction is necessary or economical, it will pay you to consider Atlas High-Early cement. Send for a copy of the booklet "Case Histories of Days and Dollars." It shows how many contractors have produced serviceable concrete in much less than the usual time—how it has saved them time and money on all kinds of jobs! Universal Atlas Cement Co. (United States Steel Corp. Subsidiary), Dept. NR-6, Chrysler Bldg., N. Y. C.

OFFICES: *New York, Chicago, Phila., Boston, Albany, Pittsburgh, Cleveland, Minneapolis, Duluth, St. Louis, Kansas City, Des Moines, Birmingham, Waco.*

CM-H-35

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One Pass and the Grade is Right to Specifications!

LOOK at the illustrations above — they show how a Buckeye R-B Power Finegrader, pulling itself on the forms, cuts into a roughly prepared subgrade and leaves it right on the payline ready for the paving crew! This machine prepares the grade at a cost way below trial and error hand methods and leaves it right to specifications so that you don't put in extra concrete to fill up low spots — it puts material where you want it on the shoulders and it moves fast — always way out ahead of the paver. For concrete, many types of black top roads and airport runways — any width — any kind of soil — any grade, crown or bank — you'll find the Buckeye R-B Power Finegrader is a profit-making machine. It eliminates the bottleneck on otherwise completely mechanized jobs. Plan now to modernize your grade building methods. Write for descriptive catalog on the R-B Finegrader today.

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2. **Reduces loss of yield**
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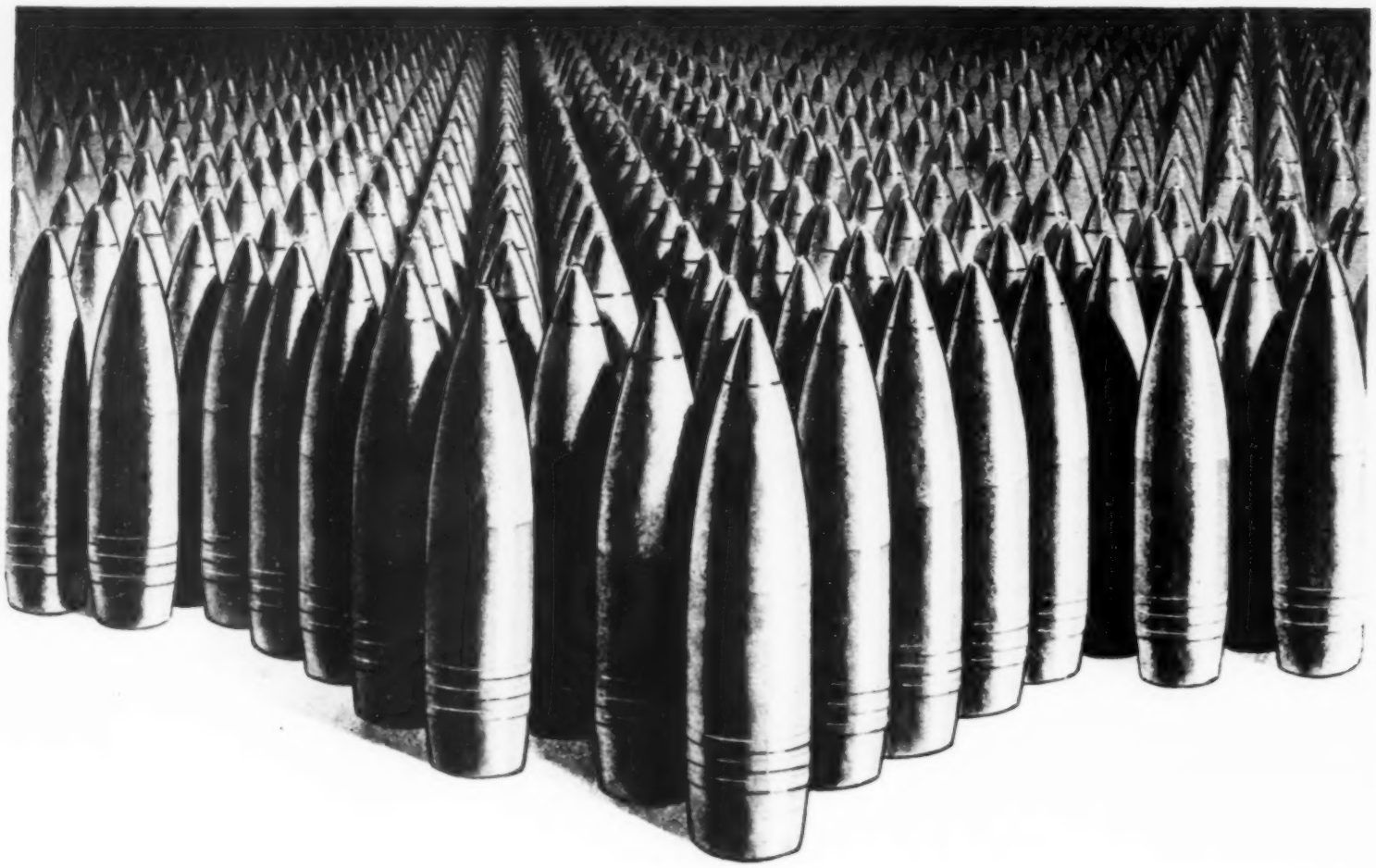

1,550,000 Projectiles for National Defense from Steel Conserved by Preformed Wire Rope

★ Because preformed wire rope lasts so much longer than non-preformed, its use by American industry is saving enough steel this year to manufacture 1,550,000 high-explosive projectiles for the United States Army's 75-mm. gun.

★ Preformed saves precious time, too, by fewer and shorter shutdowns for replacements. It also reduces the possibility of delays in delivery through less frequent re-orders.

★ Furthermore it is easier and safer to handle.

★ On top of that it saves money.

PREFORMED WIRE ROPE

Ask Your Own Wire Rope Manufacturer or Supplier

Late last year Uncle Sam was Trying to
Get Going on one of his big Florida Defense Projects
Where he had some 110 Miles of Trench to Dig
In Wet Ground.
A Couple of Promising Candidates, hired to do the Dewatering,
Weren't going Fast enough to Suit him and
The Excess Excavation and Sheeting Bills were getting
Fairly Heavy.

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So he called Barclay 7-0463,
Laid his Troubles on the Table and said
"Go to it. We're in a Hurry
and we Need some Real Help."
After we moved in, the Promising Candidates were Benched,
And the Remaining 85% of the Job was Finished
In about Three Months — Moretrench Fashion —
Dry and Unsheeted.
Estimates indicate that the Change
Saved Uncle Sam over a Million Dollars
And, if he had got off on the Right Foot First,
He might have Saved a Quarter of a
Million More.
He and nearly 80%* of the Wellpoint Users in this Country
Know that the Small Extra Cost they pay for Moretrench Equipment
Is an Investment that Pays a Substantial Dividend
Every Time.

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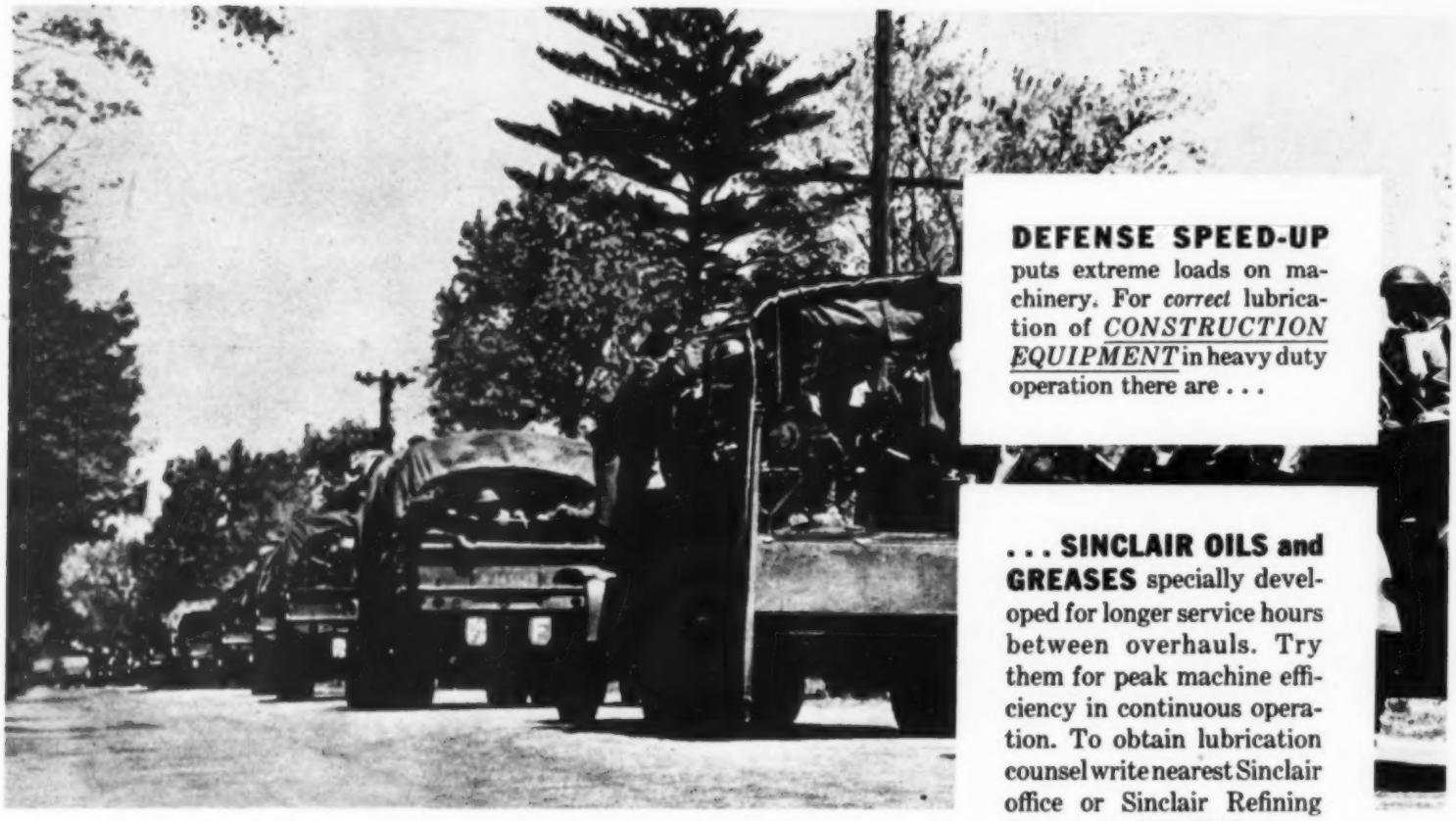

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ROLLED ALLOY STEEL CONSTRUCTION MEANS BETTER DIGGING

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This new design results in steadier digging, faster output, fewer repair bills. P&H owners have proved it on thousands of jobs. Prove it yourself on *your* next job.

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S-M-O-O-T-H as steam — P&H's new hydraulic control. Try it!

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40% MORE RUBBER IN THE TREAD

FOR LONGER LIFE ON BIG TONNAGE JOBS

FROM every standpoint this big and better new Goodyear All-Weather Earth Mover tire is in a class by itself—as you can easily judge from these facts:

There is up to 40% more rubber in tread and sidewalls—*for longer, tougher wear and greater resistance to cutting.*

Its famous All-Weather diamond block tread design is extended down over the shoulders below center of sidewalls—*to provide side traction and prevent side-slip on grades,* as well as to protect the carcass from cutting and snagging in this vital area.

Tread channels are wider and extend straight across the tread with smooth-rounded edges—*to shed stones and force out dirt.*

New high-tensile cord carcass—12% to 15% stronger than previous tires—*affords greater bruise resistance.*

Multiple compounding assures equal distribution of internal stresses throughout body—*more tire life with less heat and fatigue.*

Super-strong beads—*armor tire against rim-cutting and chafing.*

Cross-section sizes fully up to approved maximum widths—*provide more load capacity and better flotation for heavier loads.*

You can get this great new tire in all popular large sizes. Its far sturdier construction insures far longer wear—*lower cost per mile.* See it at your Goodyear dealer's.

All-Weather—T. M. The Goodyear Tire & Rubber Company

THE GREATEST NAME IN RUBBER

GOODYEAR

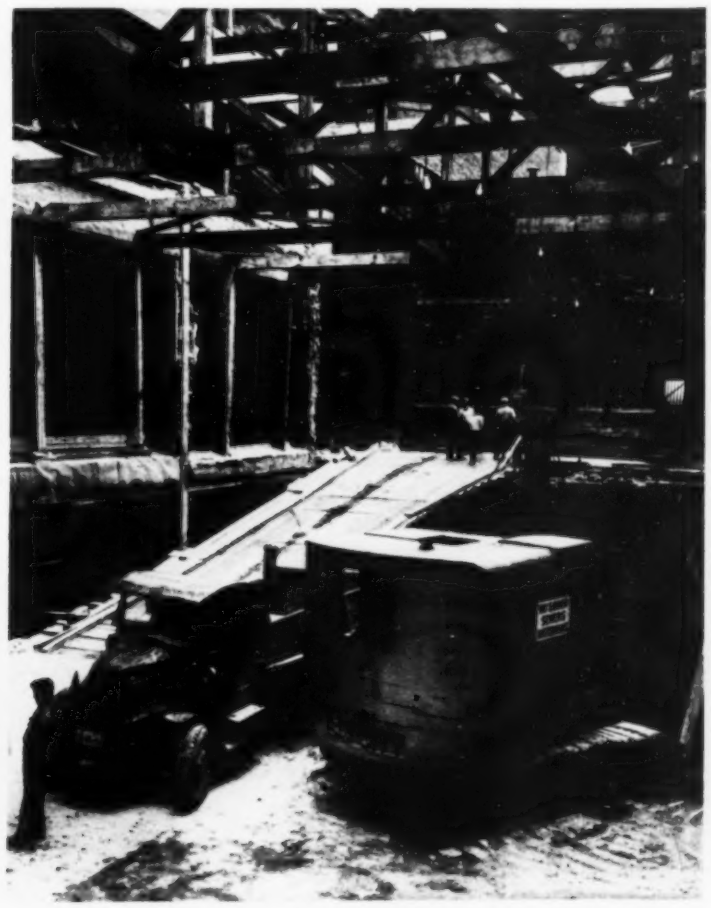
MORE TONS ARE HAULED ON GOODYEAR TRUCK TIRES THAN ON ANY OTHER KIND

Construction Methods

ROBERT K. TOMLIN, Editor

Volume 23 | SEPTEMBER, 1941 | Number 9

LIMITED CLEARANCE between basement floor and wood trusses bracing brick wall of adjacent building influenced use of back-hoe to handle sub-basement excavation for store addition.



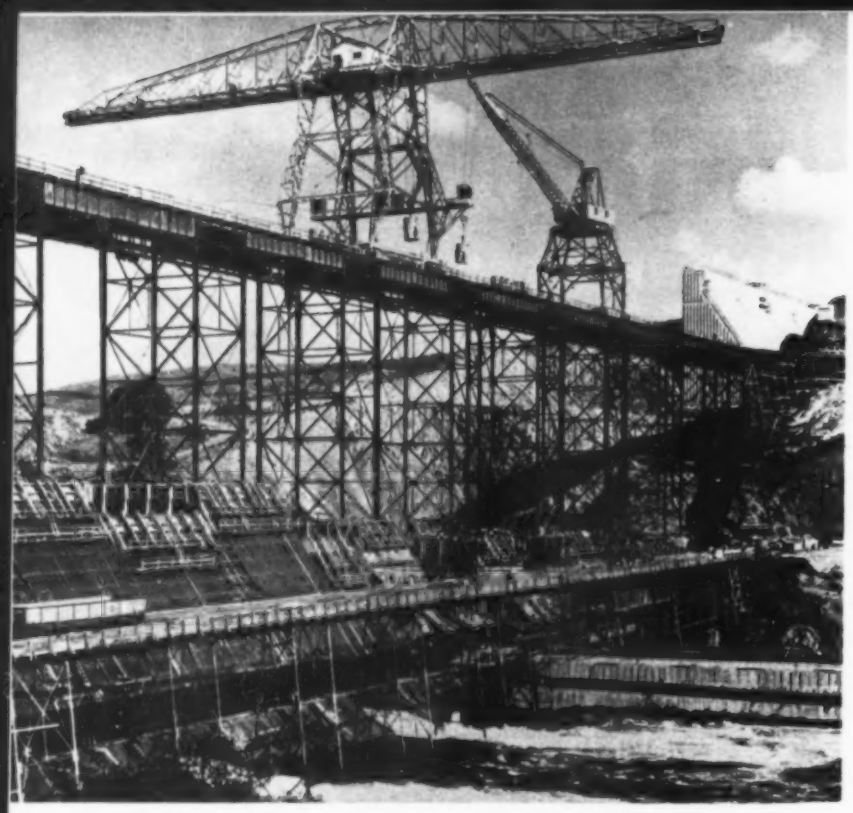
TIMBER RAMP connecting basement with alley at rear of building enabled trucks to enter and leave hole with loads of spoil from sub-basement excavation.

With Low Headroom

BACK-HOE DIGS SUB-BASEMENT

EXCAVATION with a ½-cu.yd. back-hoe under conditions of limited clearance due to the necessity of underpinning and bracing with light wood trusses the wall of an adjacent brick structure solved the problem of taking out the sub-basement for a four-story addition 60x100 ft. in plan, to the F. W. Woolworth Co. store in Detroit, Mich. The available headroom between the wood trusses and the original basement floor level precluded excavation with other types of equipment.

Trucks entered and left the hole over a timber ramp connecting the basement with an alley at the rear of the building site. Spoil dug by the back-hoe, a Bay City machine, to a depth of 15 ft. for the sub-basement, was loaded directly into the trucks at basement level. For the new building Barton-Malow Co., of Detroit, is general contractor, with Charles J. Rogers sub-contractor for the basement excavation work. The architects for the store addition were Hyde & Williams of Detroit.



THIS MONTH'S NEWS REEL

ON TALL STEEL CONSTRUCTION TRESTLE giant cranes of hammerhead and full-revolving types, operated by Griffith Co. and Bent Co. contractors for U. S. Bureau of Reclamation, lower endless succession of buckets full of concrete into Friant Dam as it rises above San Joaquin River in California. At upper right is almost completed section of dam, giving indication of ultimate height of 320 ft. above lowest foundation.

NEW CRIMINAL COURTS BUILDING (below) and city prison, recently completed in downtown New York by Cauldwell-Wingate Co., ranks among world's largest municipal structures. Built at cost of $19,300,000, under direction of city's Department of Public Works, structure 352 ft high above street level provides more than one million square feet of floor area. Quantities included 17,500 tons of structural steel; 162,000 cu.ft. of limestone; 44,000 cu.ft. of polished granite; and 7,000,000 common and face brick. Wide World Photo

U. S.-CANADA OIL PIPE LINE linking Portland, Maine, and Montreal over 236-mi. route, is scene of celebration as American and Canadian workers give "thumbs up" sign after completing joint at international boundary near Highwater, Province of Quebec. Construction of pipe line, 12 in. in diameter, by Standard Oil Company of N. J., is described elsewhere in this issue.

RISING COLUMNS OF CONCRETE mark progress of construction of Tennessee Valley Authority's Cherokee Dam, now ahead of its 20-month completion schedule. Closure of dam and first storage of water are scheduled for December, 194'

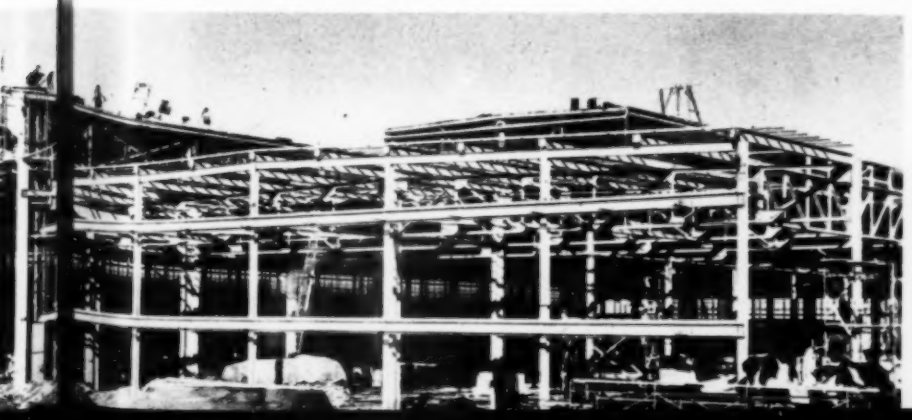
ELEVATED EXPRESS HIGHWAY takes form in Brooklyn, N. Y., as Harris Structural Steel Co. of New York City, erects section of Gowanus Parkway. Cantilevered roadway is carried by pairs of inclined steel legs forming trestle bents.

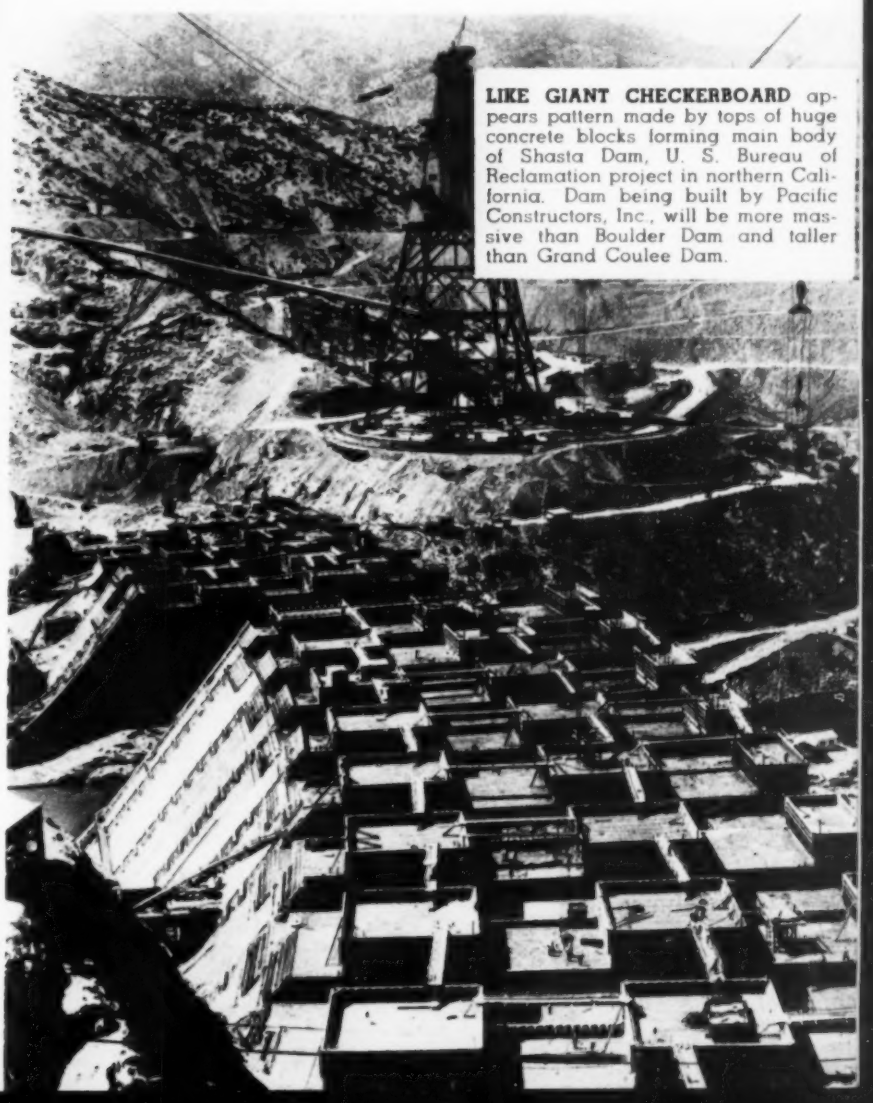
PIT RIVER BRIDGE supported by concrete piers of skyscraper height (360 ft.) is double-deck structure which will carry both railroad and highway traffic across reservoir to be created by construction of Shasta Dam, U. S. Reclamation project in California. Photograph shows three main spans in place covering length of 920 ft., or about one-fourth the length of the completed bridge.

SHORTAGE OF OFFICE SPACE in Washington, D. C., will be relieved by War Department's new buildings located between 4th and 6th Sts. at Independence Ave. S.W. This view shows midsummer progress by McCloskey & Co. of Philadelphia, which holds general contract for the project.

Wide World Photo

NEW AIRCRAFT ASSEMBLY PLANT (below) with main building 600x400 ft in plan, is completed for Bell Aircraft Corp. at Niagara Falls, N. Y., by The Austin Co., engineers and builders of Cleveland, Ohio, as described elsewhere in this issue. Project required 2,000 tons of structural steel, including trusses of 200-ft. span weighing 38 and 45 tons. At end of structure is opening for 195-ft. overhead canopy door.





LIKE GIANT CHECKERBOARD appears pattern made by tops of huge concrete blocks forming main body of Shasta Dam, U. S. Bureau of Reclamation project in northern California. Dam being built by Pacific Constructors, Inc., will be more massive than Boulder Dam and taller than Grand Coulee Dam.

First Emergency Oil Line

236 MILES LONG BUILT ON 120-DAY SCHEDULE

SNAKING ITS WAY through uneven terrain, pipe line follows tortuous course marked by many vertical and horizontal curves requiring field bending.

PUSHING FOR FAST PROGRESS on pipe-line construction are these three men: (Left to right) GEORGE LEE, assistant chief engineer, Portland Pipe Line Co.; H. L. DAVIS, general superintendent, Williams Bros. Corp., and H. M. STEVENSON, chief engineer, Portland Pipe Line Co.

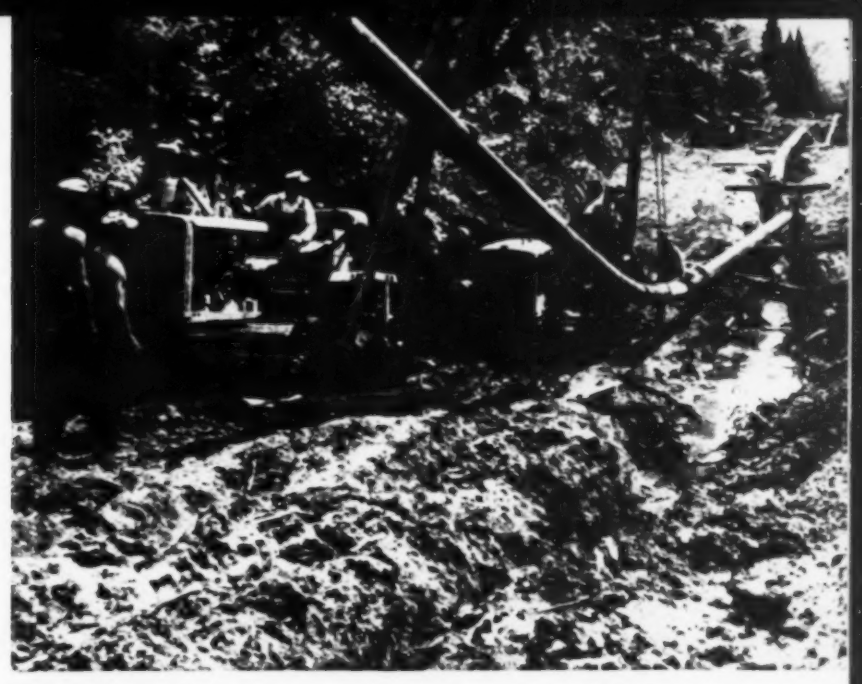
TAKING THE LEAD IN DEFENSE EMERGENCY EFFORTS to relieve the tanker shortage on the Atlantic coast, the Standard Oil Co. of New Jersey is rushing construction of a 236-mi. oil pipe line from Portland, Me., to Montreal, Canada, on a 120-day schedule which sets the pace of progress at better than 2 mi. a day for the two pipe-line contractors, the Williams Bros. Corp., Tulsa, Okla., and the Oklahoma Contracting Co., Dallas, Tex. A force of 1,700 men amply supplied with equipment, $300,000 of it purchased new for this job, is pushing the work 10 hr. a day and seven days a week to assure completion of the 12-in.-diameter line, with electrically welded joints, by the stipulated date of Oct. 31, allowing another month to put everything in readiness for the start of oil delivery on Dec. 1. Techniques and tools tested by long experience on construction of many previous pipe lines have been adapted by the contractors' skilled personnel to the building of this high-speed job traversing an unfamiliar terrain which ranges from soft swampland to rock-ribbed mountains crossed at a maximum elevation of 1,950 ft. above sea level.

Included in the project are facilities for unloading tankers and storing oil at the eastern terminus of the line in South Portland, Me. A finger wharf provides unloading accommodations for two 150,000-bbl. tankers carrying crude oil from Colombia or Venezuela. Ten to twelve days of additional tanker travel to Montreal will be saved by discharging at this point. Six floating-roof-type tanks of 140,000-bbl. capacity, under construction by the Chicago Bridge & Iron Co., will take care of storage needs at the terminal. At the Montreal end of the line, the pipe crosses the St. Lawrence

TIGHT GOING (below) on narrow right-of-way for tractor-trailer outfit stringing 40-ft. pipe lengths makes it advisable to have second truck tractor to pull out trailer after load has been discharged. Nearest truck tractor then is able to back out over rough and narrow road.

WHEEL-TYPE TRENCHER excavating for 24-in. pipe at South Portland terminal is representative of other machines employed on 236-mi. line of 12-in. pipe.

TOP SUPERVISION of pipe-line operations claims services of T. A. HESTER (left), president, Oklahoma Contracting Co., and DAVE WILLIAMS, vice-president, Williams Bros. Corp.



TIED DOWN to tractor in background, pipe is raised by side-boom hoist on tractor in foreground to produce proper curvature to fit trench profile.

in a trench 16 ft. below riverbed to allow for future channel deepening. With all facilities, the cost of the complete project is more than $8,500,000.

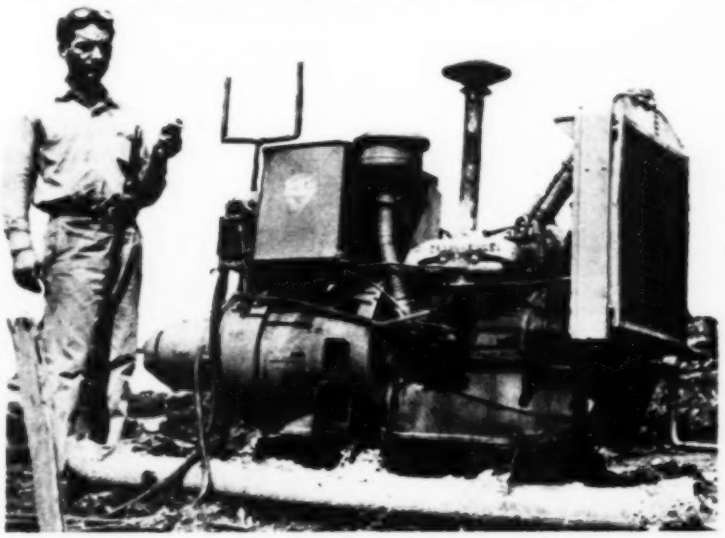
Eight pumping stations spaced about 30 mi. apart along the line will keep the oil moving at 3 m.p.h. to deliver 50,000 to 60,000 bbl. per day through the 12-in. pipe. The pipe itself, furnished in the main by the Youngstown Sheet & Tube Co., with part of the supply coming from the Spang-Chalfant Co., has a ⅜-in. wall thickness and an outside diameter of 12¾ in. It is delivered in 40-ft. random lengths with beveled ends for V-butt welded joints. The pipe weighs 49.56 lb. per linear foot. As the soil along the route gives no evidence of corrosive attack on metal, the pipe is painted with only a light primer outer coat. At the Portland terminus, 3 mi. of 24-in. interconnecting line is protected by 1 in. of hot asphalt and wrapped felt coating to resist salt water penetration.

Two Contracts—Construction of the line is divided between the two contractors in this way: All pipe work west of Gorham, N. H., amounting to about two-thirds of the total mileage, and the eight pumping stations for the entire line are being built by the Williams Bros. Corp.; the remaining pipe work east of Gorham and at the Portland terminal is being put in by the Oklahoma Contracting Co.

A narrow right-of-way averaging only 35 ft. wide causes some minor difficulties in pipe-line construction. Most of the territory along the route is rough and rugged, and highways

PLACED ON TIMBERS over trench by side-boom hoist on tractor, pipe sections are ready to be lined up and locked in contact for joint welding.

PORTABLE GENERATOR SET (below) on welded tubular runners is one of many units providing current for joint welding on pipe line.



STREAM CROSSING (below) for 12-in. line is excavated by trench hoe of type used also in digging rock sections after blasting.

ALIGNMENT CLAMP locks abutting pipe ends in position for stringer bead on 24-in. line at terminal. Clamps used on 12-in. pipe are similar.

ALL JOINTS are built up by depositing successive beads in V-shaped slot formed by abutting beveled ends of pipe sections. This welder is working on 24-in. pipe at South Portland terminal.

intersecting the line are widely separated. As the first step in construction, advance gangs of workmen fell the trees on the right-of-way, and bulldozers then clear out the underbrush and level the ground to a width of about 35 ft. In swampy stretches, trees are dropped across the access way to produce a corduroy road.

After the way has been cleared, excavating equipment moves in to dig the pipe line trench. The cut is shallow, as only 2 ft. of cover is required over the pipe. Usually the trench is 3 to 4 ft. deep. Where soil conditions permit, the contractors use trenching machines. In rock, the line is drilled and blasted, and trench hoes, ⅜ to ¾ cu.yd., remove the shattered material.

Truck tractors and two-wheel pipe trailers are employed to string the pipe along the right-of-way while excavation is in progress. Because only one point of access ordinarily is open for both ingress and egress on any section of the line, the tractor-trailer stringing the pipe usually is followed by a second truck tractor which backs up the line and hooks on to the empty two-wheel trailer to take it out for another load, leaving the first tractor free to back out with less difficulty.

Crawler tractors equipped with side booms and power hoists transfer the pipe sections on to timbers laid across the trench at 20-ft. intervals. Adjacent sections are brought into line and are locked in contact for welding at the joint with an alignment clamp. An advance welding operator puts a stringer bead around the joint, and the clamp then is removed. A second welding crew then moves up to take over the job, and the weld is built up in four passes. The welded joints have a tensile strength of 76,000 lb. per square inch. Lincoln equipment is used for the work. When the welding has been completed, the pipe is ready for lowering into the ditch.

Cold bending with side-boom tractors is employed to fit the pipe line to the uneven topography. One tractor either climbs on top of the pipe to anchor it or ties the pipe down with a cable at the foot of the boom. A second tractor at a distance of 20 to 30 ft. takes a strain on the pipe with the load line of the side boom, and pulls the pipe to the desired curvature, either horizontal or vertical.

MAKING WELD in 24-in. interconnecting oil pipe line at terminal, welder goes down on his side to carry bead around bottom of pipe joint. Ability to weld in this position is one of requirements for operators on job.

Pipe Line Tests

On an average day, a pipe-line outfit employing about 120 men on all operations from clearing to welding completes about 3,000 ft. of pipe. At the end of the 10-hr. shift, the section completed during the day is tested under air at pressures up to 120 lb. per square inch. A cap is welded to the end of the last pipe, and the air is hooked up to the other end of the test section. Before the air is turned on, a scraper with a rubber disk attached is placed in the pipe at the beginning of the test section; as the air pressure builds up, it pushes the disk through the pipe, thus cleaning out the line. During the test the joints are covered with soap solution to aid in detecting leaks.

When the line has been completed and the pumping stations are in operation the pipe will be filled with water and tested for its entire length at pressures up to 800 lb. per square inch. Normal operating pressure in the line will be 720 lb. per square inch.

Because of the international character of the line, the Standard Oil Co. of New Jersey set up two subsidiaries to carry on the work. In the United States, the Portland Pipe Line Co. is in charge, while the Canadian section, about 65 mi. in length, is being built by the Montreal Pipe Line Co. All engineering and construction for the entire line are under the direction of H. M. Stevenson, chief engineer of the Portland Pipe Line Co. George Lee is assistant chief engineer, and A. H. Chapman is project engineer at the Portland terminal.

For Williams Bros. Corp., contractor for the eight pumping stations and for roughly two-thirds of the pipe line, running west of Gorham, N. H., to Montreal, David Williams, vice-president, is supervising construction, and H. R Davis is general superintendent. Operations of the Oklahoma Contracting Co., responsible for all pipe work east of Gorham, N. H., are directed by T. A. Hester, president.

Experimental Barracks Test

All-Steel and Masonry Construction

TO TEST THE PRACTICABILITY of using materials other than wood for army barracks, the Quartermaster Corps has erected at Camp Grant, Ill., eight experimental buildings utilizing all-steel, concrete block and hollow tile construction. The group includes four all-steel buildings of two types, two concrete block barracks with concrete floors and roof, and two hollow tile buildings, one with wood interior frame and floors and the other with steel inner frame and upper floor of concrete joists and tile arches. All the buildings conform to standard barrack dimensions, 28 ft. 8 in. by 80 ft., and rest on foundation piers spaced as usual under wood-frame barracks.

Two all-steel barracks supplied by the H. H. Robertson Co., Pittsburgh, have steel frames of built-up welded members and wall siding consisting of interlocking cellular panels, of full story height and 2-ft. width, made up of 20-gage galvanized asbestos - protected steel sheet, with an interior backing of 20-gage sheet metal. The panels are set with the cells in vertical position. The interior surface of the walls is faced with Masonite wall board separated from the exterior panels by 1-in. rigid insulation. Sub-floors are cellular steel, carrying wood parquet floors set in mastic. A flat steel roof deck is covered with 1-inch insulation and built-up roofing.

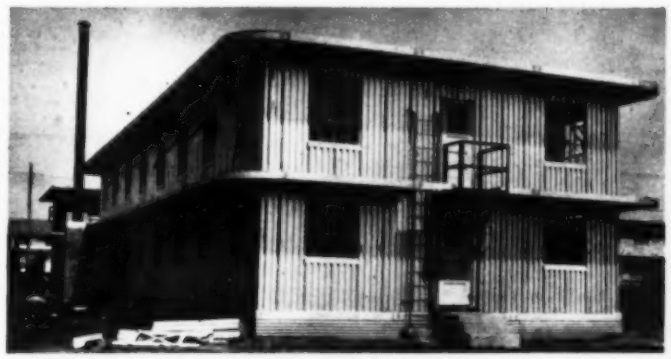
In another pair of all-steel barracks, fabricated by the Globe - Wernicke Co., Cincinnati, bolted steel frames support wall siding, sub-floors and roof decking made up of trough-shaped 18-gage steel panels 12 in. wide. Exterior walls are finished on the inside with wall board on 1-in. rigid insulation, and three-ply composition roofing is laid over insulation on the flat roof. Single-layer wood flooring is placed on wood nailing strips supported jointly by upturned flanges of adjacent trough-shaped steel panels.

On all four steel buildings, continuous hoods are formed above the windows by projecting the floor and roof decks 3 ft. beyond the walls.

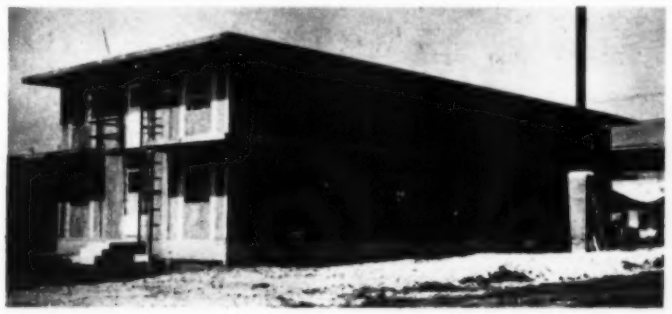
For the load - bearing walls of the concrete block and hollow tile structures, foundation walls were required in addition to the usual concrete piers. The two concrete block buildings are identical, except that cinder blocks were used in one, concrete in the other. Exterior walls built up of 7¾x8x15¾ in. blocks were left unfinished on the inside. The first floor is 4-in. concrete slab on fill, supporting wood sleepers, subfloor and finish floor. An interior frame of concrete columns and beams, with 4-in. flat slabs for the second floor and roof, complete the structure. The second floor is finished in wood similar to the first floor, and the roof slab is insulated with 1-in. cork under prepared roofing.

Both tile buildings have gable roofs supported by wood trusses which provide a clear span for the second story dormitory of the barracks. Exterior walls are built of 8x8x15¾ in. load-bearing units laid with cells horizontal. The inside face is smooth, and no interior finish is used. Two types of interior framing and floors are employed, as already noted.

Holabird & Root, Chicago, architect - engineer for construction of Camp Grant, designed the experimental barracks. John Griffiths & Son Construction Co., Chicago, is general contractor for the camp, and Major Howard Graham is constructing quartermaster in charge for the War Department.



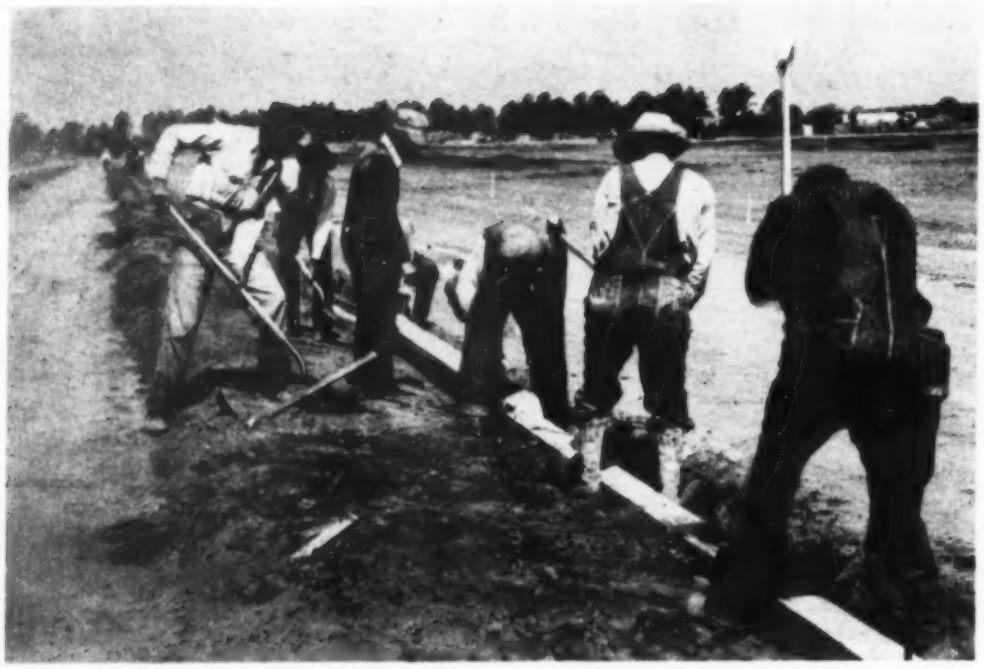
VERTICAL CELLULAR PANELS in exterior walls and projecting canopies at second floor and roof levels give interesting character to external appearance of Robertson all-steel barracks.



FLAT SURFACES of walls, roof and projecting canopies lend attractive simplicity to Globe-Wernicke all-steel building.

CONCRETE BARRACKS DESIGN includes block walls and flat-slab floor and roof deck. Interior concrete frame supports flat slabs.

GABLE ROOF framed with wood trusses resting on load-bearing walls of hollow tile construction permits omission of columns in second story of tile barracks.



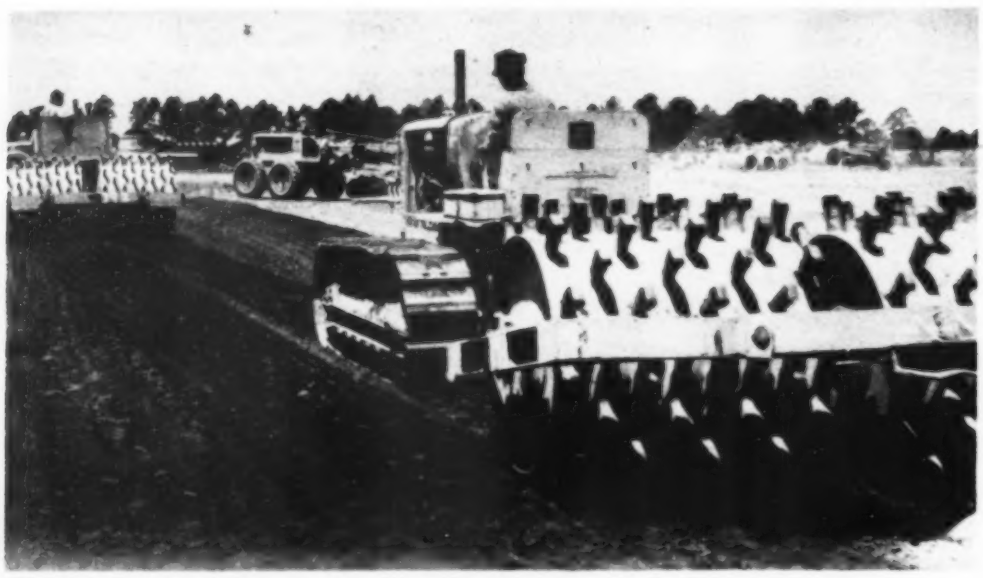
TEMPORARY FORMS of 6x6-in. timbers are set prior to processing alternate strips 25 ft. wide.

Soil-Cement Construction

SPEEDS ARMY AIRFIELD PROJECTS

ROTARY TILLER is used as mixing tool in conjunction with gang plows, disks and cultivators.

APPLICATION OF WATER under pressure is made with trailer unit.



ALL BUT SURFACE COMPACTION is obtained with tractor-hauled sheepsfoot rollers.

SOIL-CEMENT CONSTRUCTION, which has received widespread use on streets and roads, has also become an important factor in building army camps and flying fields. The speed with which soil-cement can be built makes it fit well into the U. S. Army's program of providing, quickly, training facilities for an ever-increasing air force. Until the national defense emergency arose, about 4,000 sq.yd. of 6-in. soil-cement was top production for one crew using simple, normal equipment. Then, according to production figures collected by the Portland Cement Association, real speed records began to be established.

At U. S. Flying School Airport No. 1, Avondale, near Macon, Ga., for instance, three contractors' outfits averaged more than 13,000 sq.yd. per working day, a maximum of 16,200 sq.yd. being reached.

Cleary Bros., working on soil-cement runways at the West Palm Beach (Fla.), Airport, placed 9,166 sq.yd. in each of two successive 12-hr. days and averaged more than 6,000 sq.yd., day in and day out.

D. W. Winkelman, contractor on runway construction at the Windsor Locks (Conn.), Airport, using a large outfit, averaged 7,800 sq.yd. daily, processed 16,241 sq.yd. on his peak day, and completed more than 86,000 sq.yd. in 11 processing days.

Now comes word that the Hardaway Contracting Co. placed 18,875 sq.yd. in a single day at U. S. Flying School Airport No. 6, Albany, Ga.

Soil-cement at Avondale, Ga., was used in building a 75-ft. runway each on side of 150 ft. x 4,500 ft. portland cement concrete runways and for a combined parking area and apron 450 ft. wide and 2,400 ft. long. Total soil-cement built at this field was approximately 260,000 sq.yd. Soil-cement was processed to a depth of 6 in. Both runway areas and apron were processed in alternate strips 25 ft. wide, using 6x6-in. timber forms. Forms were removed when intervening strips were built. The cement quantity used was 9 per cent by volume. Dampened earth was spread over the processed areas during the moist-cover period.

Three contractors' outfits worked simultaneously. Although actual process-

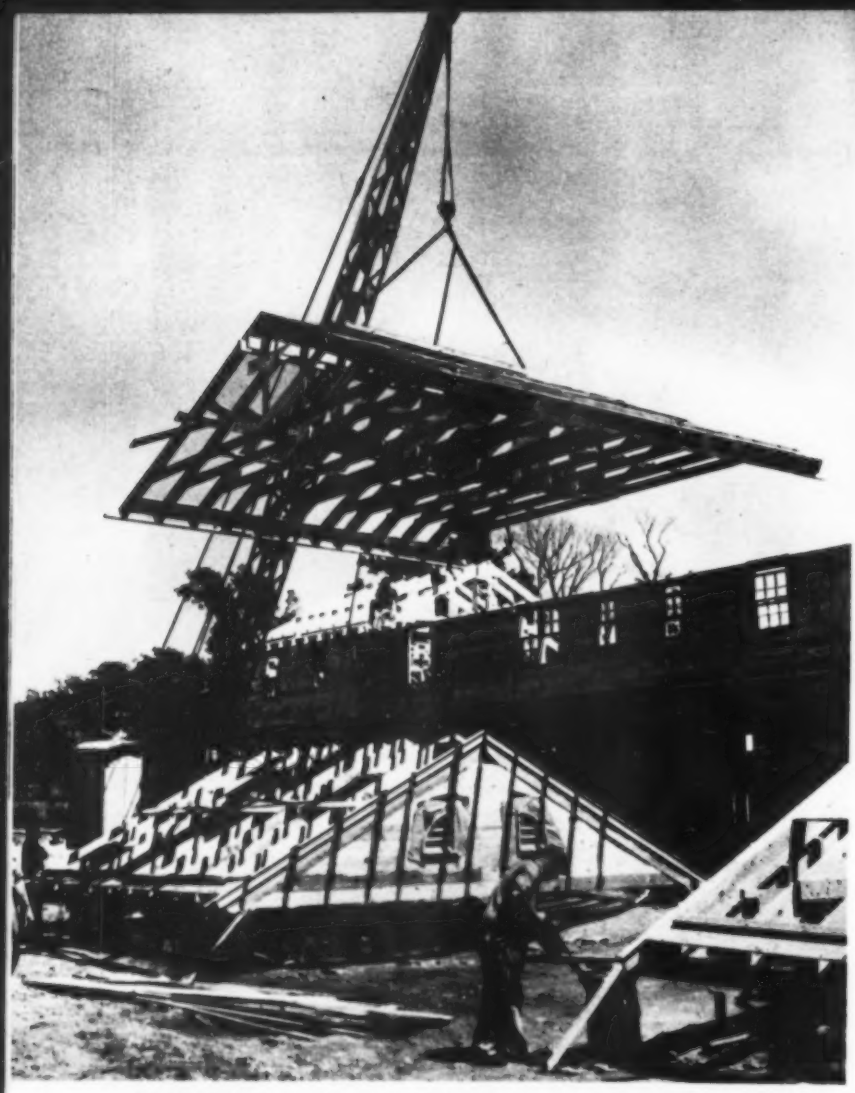
(Continued on page 106)

FINAL SHAPING and finishing operations are done with motor patrol grader.

NAIL DRAG is employed in final finish to eliminate surface compaction planes.

Shadowless Lighting FEATURES MODERN DRAFTING ROOM

MODERN EQUIPMENT, including glass block walls and fluorescent lamps arranged so as to produce practically shadowless illumination, are features of the new 37x40-ft. drafting room designed along the most modern lines to accommodate 40 draftsmen of the Pittsburgh-Des Moines Steel Co. The three exterior walls are of glass block with a window area of 1,000 sq.ft. or about 0.703 sq.ft. of window area per square foot of floor space. The room is illuminated uniformly with 51 80-watt fluorescent lamps of the white type consuming 5,100 watts of electricity, or about 3.45 watts per square foot of floor space, and producing 75 ft.-candles at the table top working level. Lamps located 7½ ft. above the floor are suspended by stems with ball and socket connection at ceiling so that they hang vertical. Electrical consumption is said to be about one-half of what it formerly was with 300- and 500-watt incandescent lights while illumination is three times as great. There is one 48-in. light over each end of each drafting table, resulting in practically shadowless illumination. The new drafting room is air-conditioned.

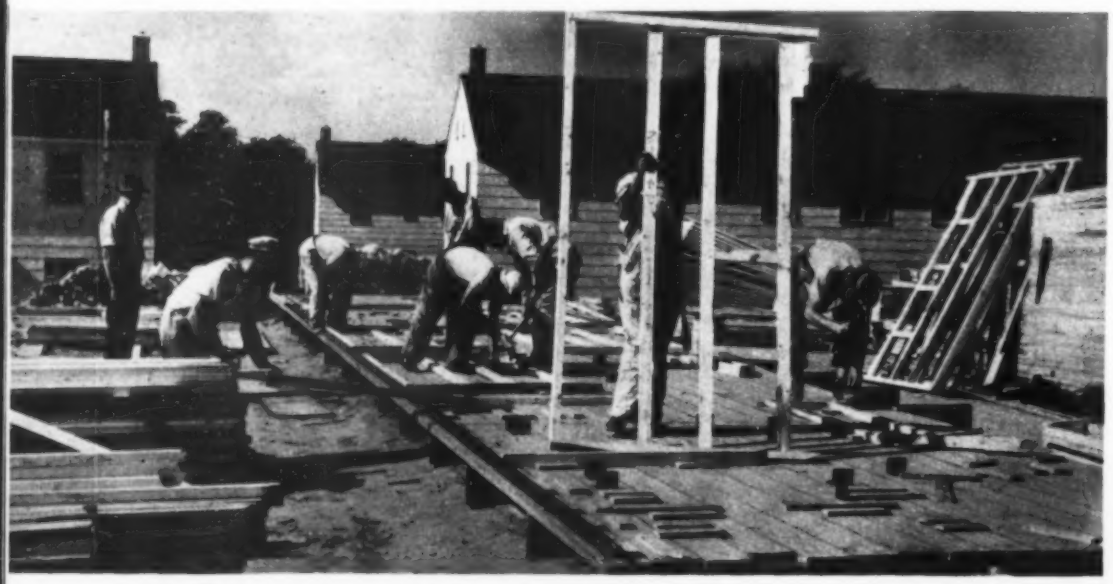


ROOF FRAME. completely assembled on ground, is hoisted to place above second story of building by crawler crane. One-third of roof is set in place at a time.

Site Assembly

SPEEDS BUILDING OF HOUSES FOR DEFENSE WORKERS

U. S. Housing Authority photos by Esper



JIG TABLES speed up assembly of interior partitions, using lumber cut to exact lengths and nailed together when fitted into jig pattern. On this table six different partitions are assembled at once.

ROOF FRAMES (below), assembled on ground, are ready for hoisting to place by crane. Assembly and placement requires only two hours.

TWO-STORY WOOD FRAME STRUCTURES to provide 538 homes for defense workers in Newport, R. I., are built by site assembly methods based on mass fabrication and assembly methods at wood-working mill (in foreground) where wall frames, roof trusses and other parts are cut and laid out with aid of jigs on long platforms.

ROOF TRUSS ASSEMBLY proceeds at rapid pace alongside partially completed house as temporary wood ceiling is laid down of same length and width as building for which roof is being erected.

INCREASED SPEED in the construction of homes for defense workers, the U. S. Housing Authority reports, is being attained by contractors employing "Site Assembly," a development by which factory production methods are carried on right at the job.

The site assembly technique has been so developed in the building of a 538 home project at Newport, R. I., that whole roofs, complete with shingles, are built on the ground and swung into place by cranes.

The system, as used at Newport, has as its main feature a long platform equipped with jigs and other devices for laying out frames of whole walls, the lumber having been previously cut to exact size in a plant near one end of the platform. The patterns on the platform are designed to provide openings for doors and windows, thus eliminating

ROOF RAFTERS are drilled for bolt holes on conveyor line and are passed on for sawing to exact length.

HEAVY HINGES are installed for holding partitions or wall panels in place during up-ending operation.

UP SHE GOES! Exterior wall **(below)**, prefabricated for second story of building, is up-ended by building crew without necessity of exterior scaffolding.

ROLLER CONVEYOR LINE (below) supplies jig tables with material cut to proper dimensions for assembly.

COMPLETED BUILDINGS are substantial two-story structures grouped in rows, back to back, with wide intervening space.

ANGLE CUT on wood member is made by power saw.

the necessity for cutting and fitting after the wall frames are erected as is done under conventional methods.

After the wall frames leave the platform they are taken by truck to the site of a house and laid out on the floor. Sidings are nailed on and windows installed before the walls are raised into place. A feature of the plan includes the use of large hinges, fastened to the flooring and the walls to permit easy hoisting of the wall and at the same time keeping it securely in position. The wall then is nailed in place and the hinges removed to be used elsewhere.

Similar methods are used in the preparation and installation of smaller items that go into the structure as well as in the finishing of interiors. Other projects, including one at Charleston, S. C., and another at Pensacola, Fla., have been built by contractors using a like technique.

The defense housing project at Newport, R. I., is being built by M. Spinelli & Sons, contractors, of Boston, Mass., from plans prepared by Howe & Prout, architects, of Providence, R. I.

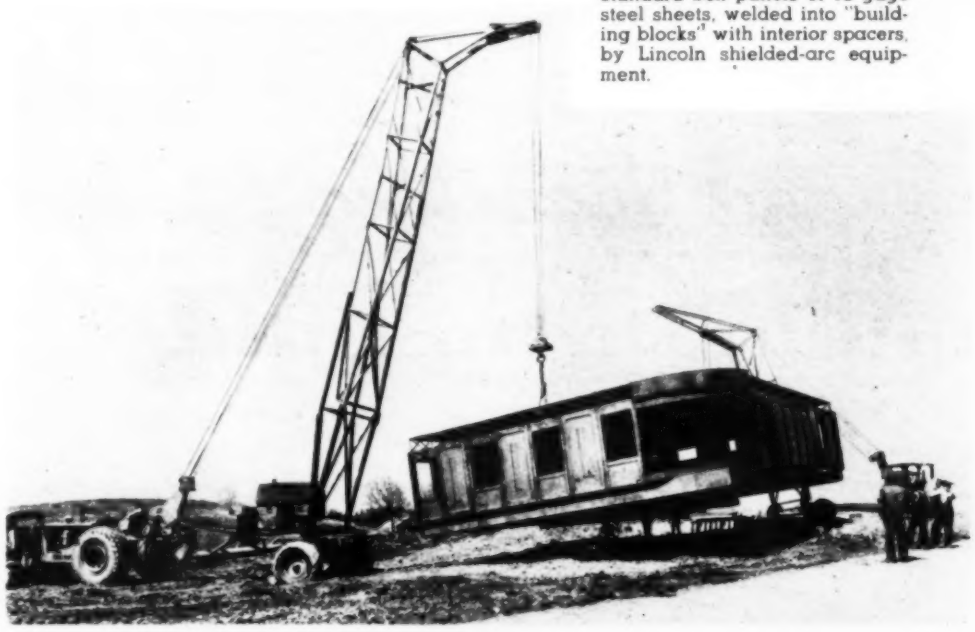
STRINGERS FOR BASEMENT STAIRS are cut at wood-working mill and assembled by men close by. Stairs are set in place in one piece. At left is pile of completed stair units.

JOB oddities

UNUSUAL FLOWER, known as "power plant," blossoms in concrete of power house at U. S. Bureau of Reclamation's Grand Coulee dam in Washington. Close examination of perennial discloses that, actually, it is made of colored paper and its stem is ground wire protruding from floor. At first red rags were tied to cable to mark it as stumbling block, but aesthetic sense of construction workers influenced change of ugly danger signal into colorful bud.

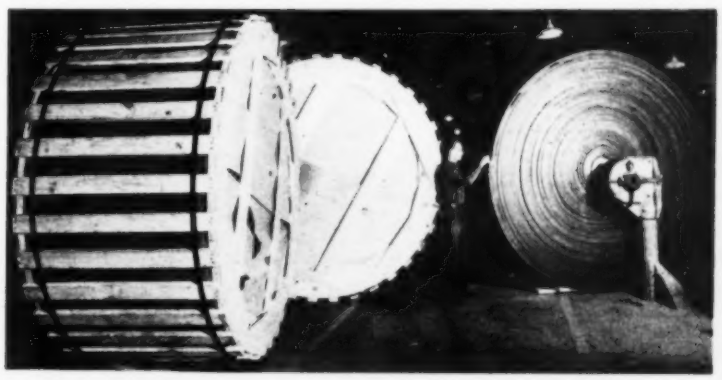
PREFABRICATED AS A UNIT BY WELDING, this all-steel building to serve as radio station WRLC, constructed and operated by R. G. LeTourneau, Inc., at Toccoa, Ga., was transported 3 mi. from LeTourneau plant to site by truck-trailer, unloaded and set in place by tractor-crane. Structure is made of standard box panels of 12 gage steel sheets, welded into "building blocks" with interior spacers, by Lincoln shielded-arc equipment.

FIREWORKS that rival pyrotechnics commonly seen on Fourth of July are produced by this Westinghouse arc-welder at work on tank of circuit breaker.

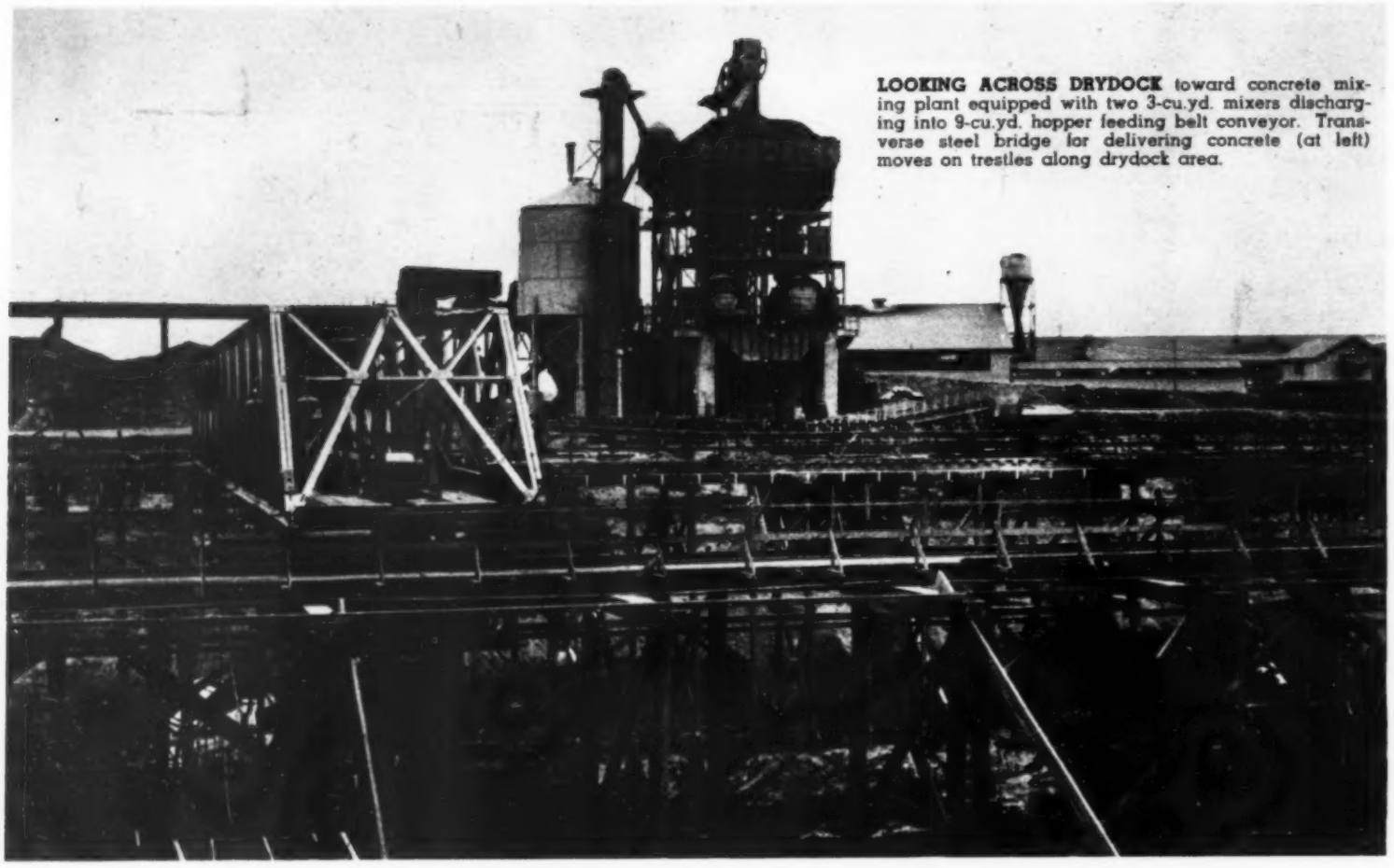


LIKE SCENE FROM GULLIVER'S TRAVELS is this view of railroad relocation around U. S. Bureau of Reclamation's Shasta dam in California, where worker stringing cable through operating mechanism of mammoth 28-cu.yd. scraper used in excavation is reduced to Lilliputian size by bulk of heavy earth-moving equipment.

POWER SHOVEL OF TOMORROW will take this form if construction equipment manufacturers adopt this plastic-bodied finger-tip-controlled model with telescopic boom, conceived by Barnes & Reinecke, industrial designers, of Chicago, and reproduced in "Future Magazine." Sleek, colored body of machine is topped by transparent dome giving operator 360-deg. vision.



"WRAP IT UP FOR PACIFIC NAVAL AIR BASES," were instructions received by shipping department of B. F. Goodrich Co., at Akron, Ohio, after orders had been received for nearly 5 mi. (25,600 lin.ft.) of cord conveyor belting for use on government defense construction projects in Hawaii. Belting sizes range from widths of 30 to 48 in.



LOOKING ACROSS DRYDOCK toward concrete mixing plant equipped with two 3-cu.yd. mixers discharging into 9-cu.yd. hopper feeding belt conveyor. Transverse steel bridge for delivering concrete (at left) moves on trestles along drydock area.

Belt Conveyors and Traveling Bridge

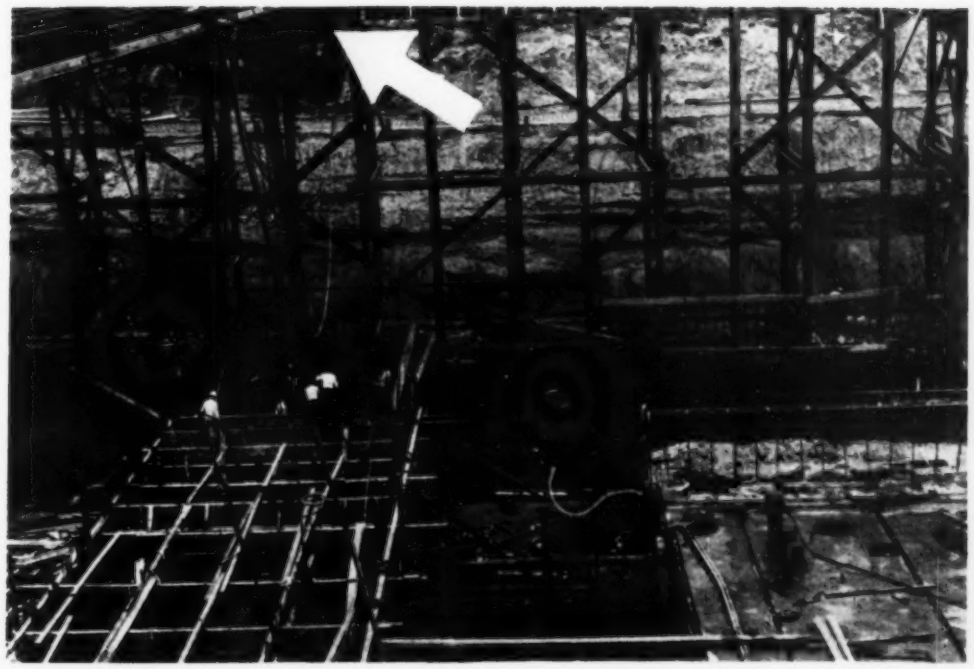
Deliver Concrete for Big Navy Drydock

CAPTAIN BYRON McCANDLESS, U. S. N., commandant, San Diego destroyer base, discusses progress of work with Lieut. Comdr. Alexander Martin, C.E.C., officer in charge of drydock construction. Concrete mixing plant appears in background and beneath it is trestle supporting one end of transverse steel bridge used in concrete delivery.

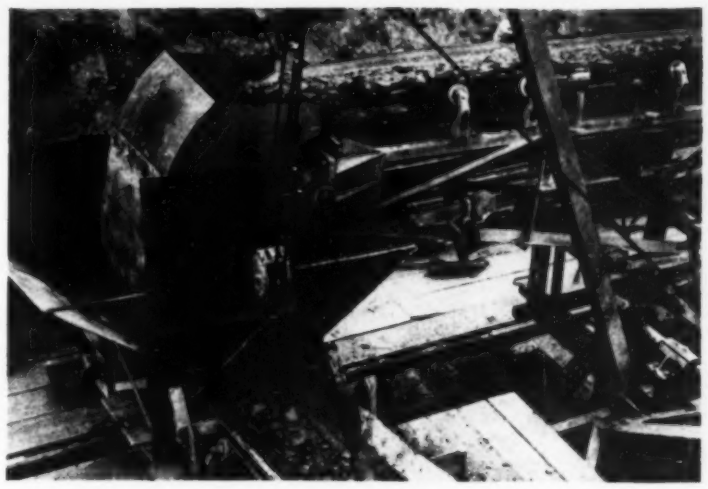
NEAR BOTTOM of 50-ft. pipe delivering concrete from traveling bridge diameter changes from 16 to 10 in.

DESIGNED FOR FLEXIBILITY and dependability of service with a minimum of operating personnel, a large-scale system of belt conveyors delivering to a traveling bridge spanning the job site constituted the key item of plant set up by the Pacific Bridge Co., under a cost-plus-fixed-fee contract with the Navy Department, to transport concrete from a central mixing plant to the 135x720-ft. area covered by a drydock being built at the Navy's destroyer base in San Diego, Calif. As described in the August issue of *Construction Methods*, (p. 62), excavation for the drydock basin to a depth of about 45 ft. below water level in the adjoining bay involved the removal by tractor-scraper outfits and draglines of 400,000 cu.yd. of earth in the dry with the aid of well points. In the big rectangular pit thus formed the plans called for pouring a concrete floor slab having a maximum thickness of 14 ft., in addition to building thick concrete side walls. The amount of concrete for

CONCRETING ADVANCES from end to end of 24-ft.-wide floor blocks extending across width of drydock. Advancing face of concrete, as here shown, takes slope of about 30 deg. Square reinforcing bars are on bottom. Round bars are ties. After placement, concrete is vibrated.



TRAVELING HOPPER (arrow) slung under traveling bridge discharges concrete through 50-ft. delivery pipe to forms on dock bottom. Floor blocks are cast alternately to simplify form work.

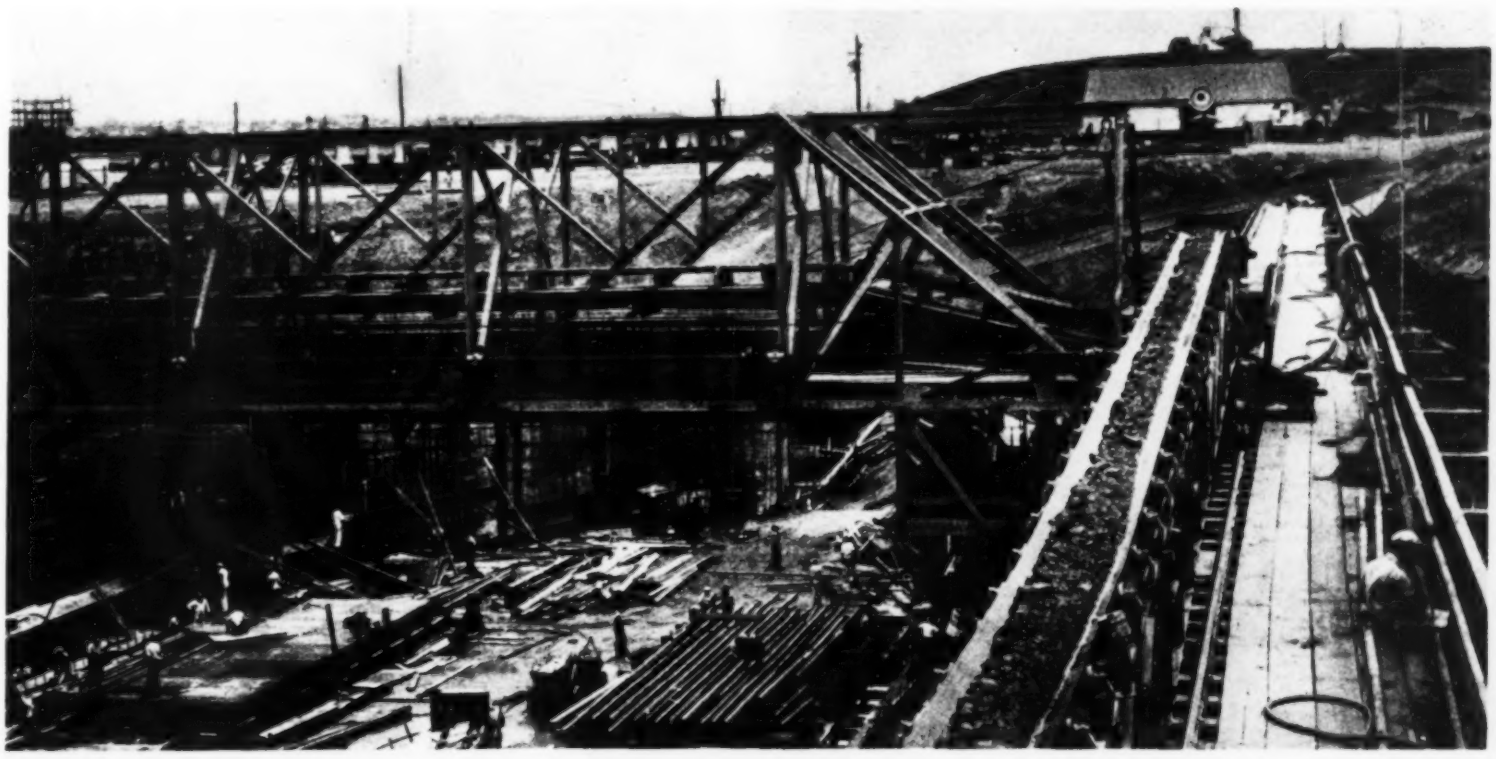


AT TRANSFER POINT (right) between conveyor units, concrete drops from end of shuttle belt into hopper feeding another belt, at right angles, on traveling bridge spanning drydock site.

the drydock is estimated at 80,000 cu.yd.

As the drydock structure is essentially a long, concrete-lined rectangular basin below ground level, concrete for the thick floor slab sections can be delivered by gravity after it has been transported horizontally from the mixing plant to points of discharge above the floor forms. A system of 24-in.-wide fixed and shuttle belt conveyors, therefore, was installed to serve the 135x720-ft. drydock area from a central mixing

(Continued on page 114)

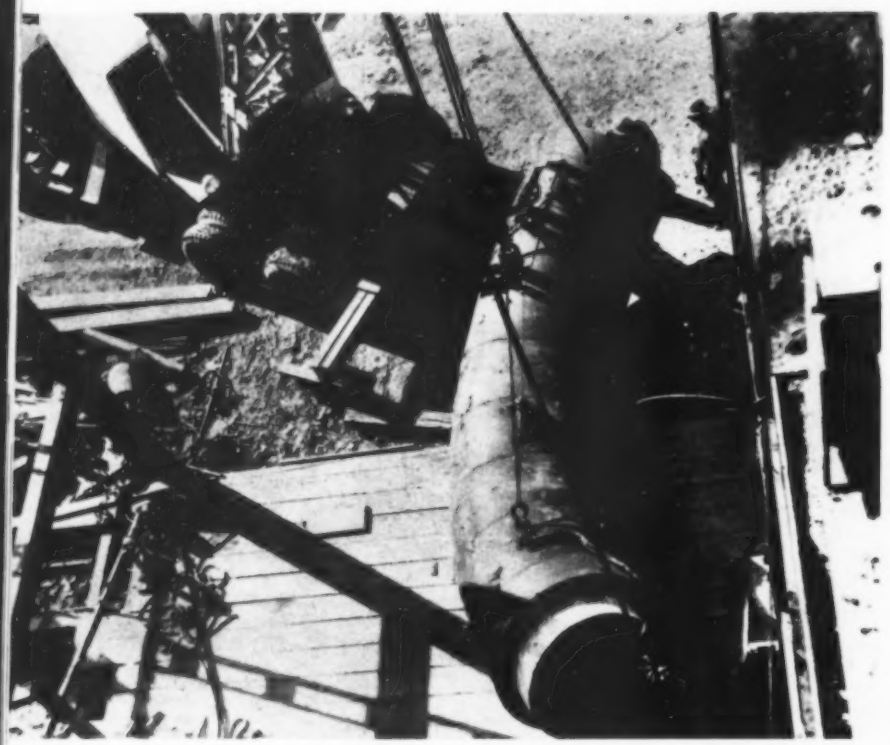


SHUTTLE CONVEYOR on south trestle deck delivers concrete to belt on transverse steel bridge that spans drydock and moves along trestle deck to pour concrete at any point in 135x720-ft. area.

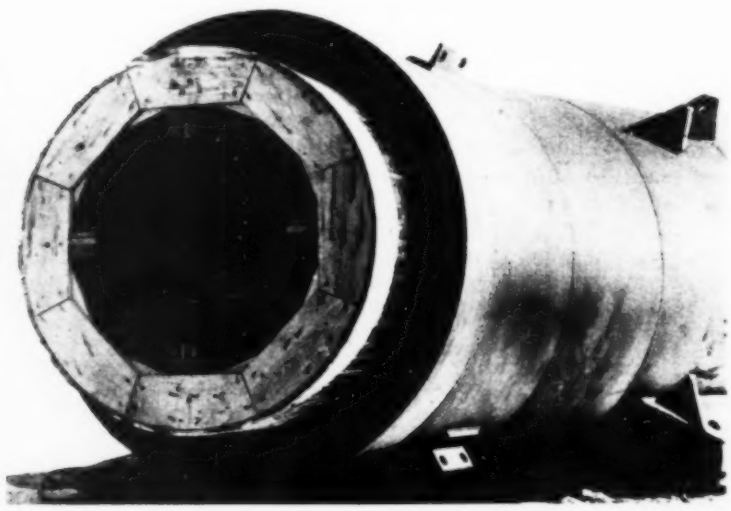
HOW *They Did It*

CONSTRUCTION DETAILS

For Superintendents and Foremen

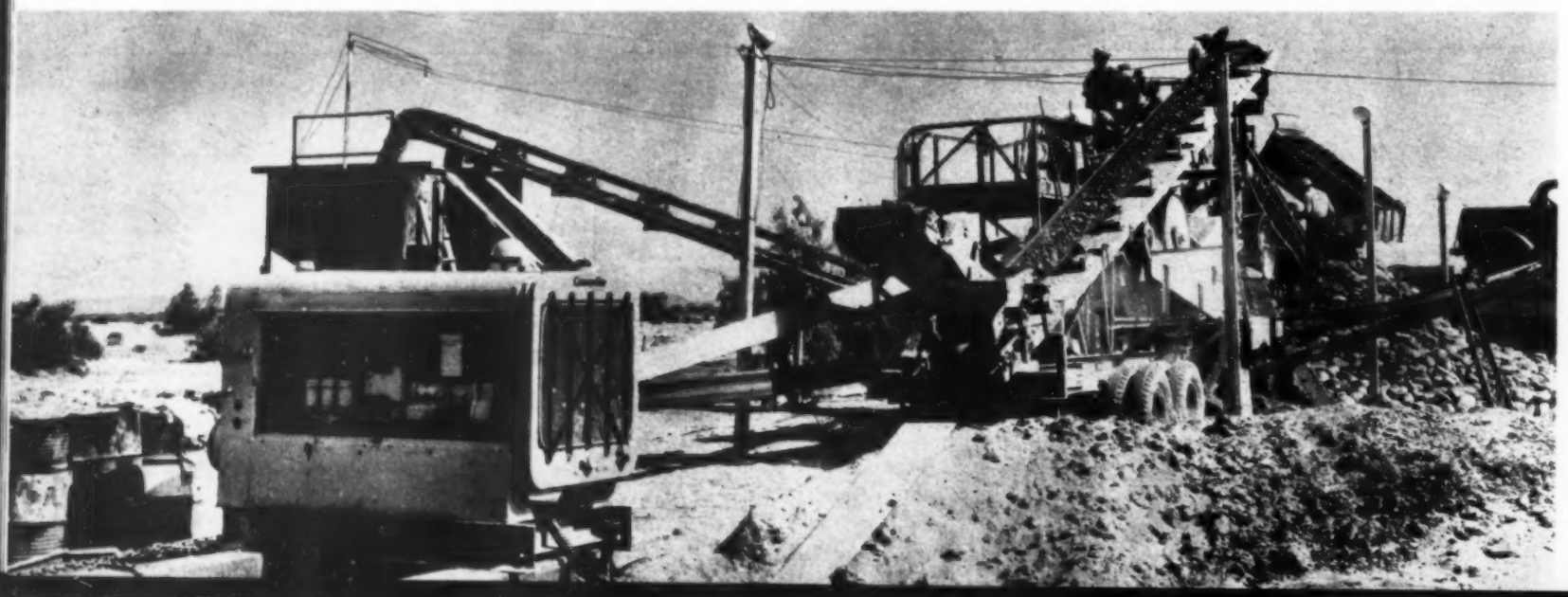


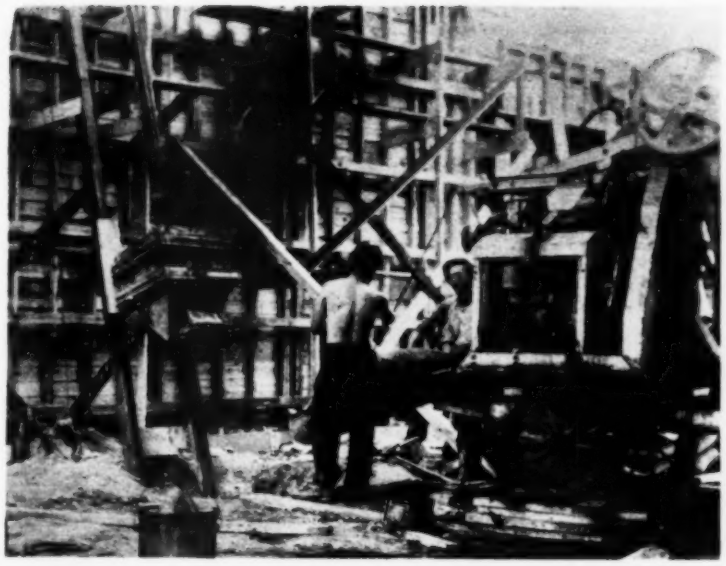
EXCAVATION IN THE DRY of an exploration caisson pit to depth of 55 ft. at Neversink dam, under construction as part of New York City's Delaware River aqueduct system, was made possible by lowering ground water level with aid of Moretrench well-point equipment, installed in three stages or lifts as digging proceeded. Job was completed in 45 days by George M. Brewster & Son, of Bogota, N. J., who are building dam under $3,406,895 contract with New York City's Board of Water Supply. Various classes of subsurface material encountered ranged from boulders, at the surface, through sand, gravel and clay to hardpan. Dewatering equipment handled ground water under maximum head of 50 ft. at bottom of pit.



CONCRETE-LINED RISER PIPE 48 in. in diameter is installed in Shaft 6, at Chelsea, N. Y., of New York City's Delaware River aqueduct. Metal pipe, lined with 6 in. of concrete, extends from main tunnel up shaft to ground surface and is embedded in concrete lining of shaft. Lining of metal pipe was done with aid of wood form **(right)** built in shop of Pleasantville Constructors, Inc., inserted in pipe and held in place by bolts. Elbow **(left)** is required at intersection of shaft with drift tunnel.—Photos from DANIEL M. HEGARTY, assistant engineer, Board of Water Supply, City of New York.

FOR PAVING AIRPORT RUNWAYS (below) with concrete at Litchfield Park, Ariz., Wallace & Wallace, contractors, of Cochise, Ariz., produce aggregate with this Pioneer portable crushing plant, powered by Caterpillar diesel engine.

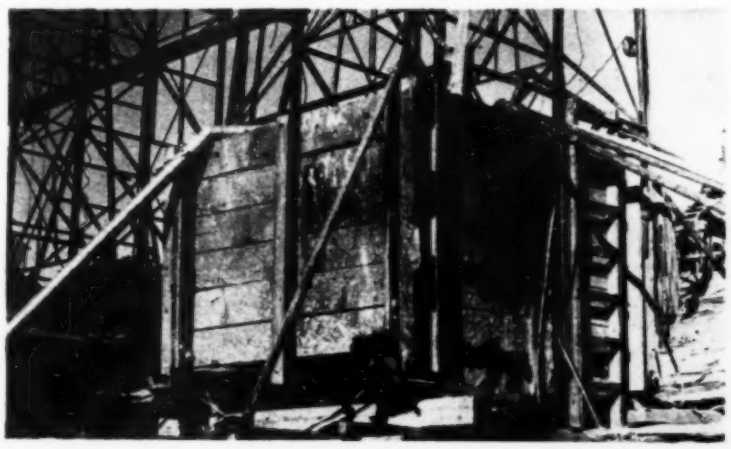


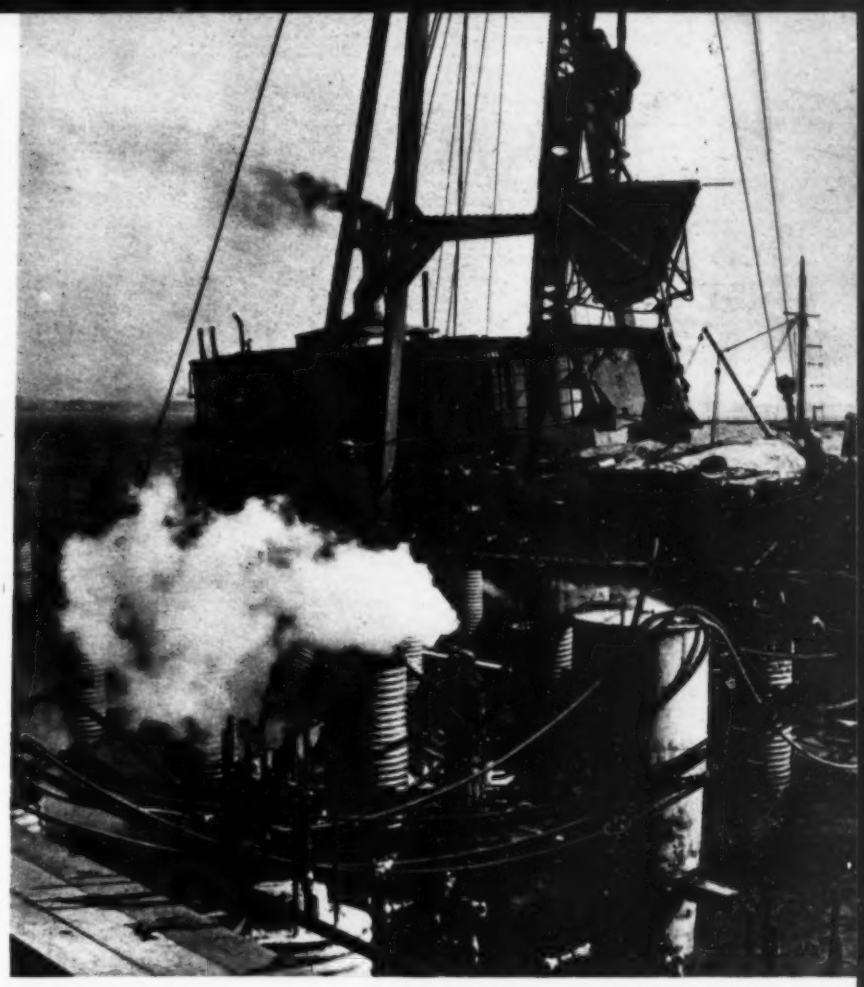


DELIVERY OF CONCRETE to forms for 24-ft.-high wall at plant expansion job of Erie Corrugated Box Co., Erie, Pa., is accomplished by means of 10-cu.ft. capacity bottom-dump skip operating on greased wood skids 36 ft. long set at angle of 12 deg. with vertical. Skip is raised and lowered by Ersted "Hyster" hoist rigged on front end of Fordson tractor. Contractor is J. C. Hammond.

WRINKLE BENDING to produce both long sweeps and short-radius curves in steel pipe is done by oxyacetylene process with aid of standard shop equipment. One end of pipe to be bent is clamped to second length of large-diameter pipe (at extreme right). As bands are heated by oxyacetylene flame end of pipe is raised by chain hoist to produce bend.

COLLECTION DEPOT FOR SEEPAGE (below) in foundation of Friant dam, in California, is provided by timber box with welded steel lining, constituting portable sump into which small pump units discharge from nearby low spots. Large pump operating against high head, drains box sump, which can be moved about job by cable sling and derrick.





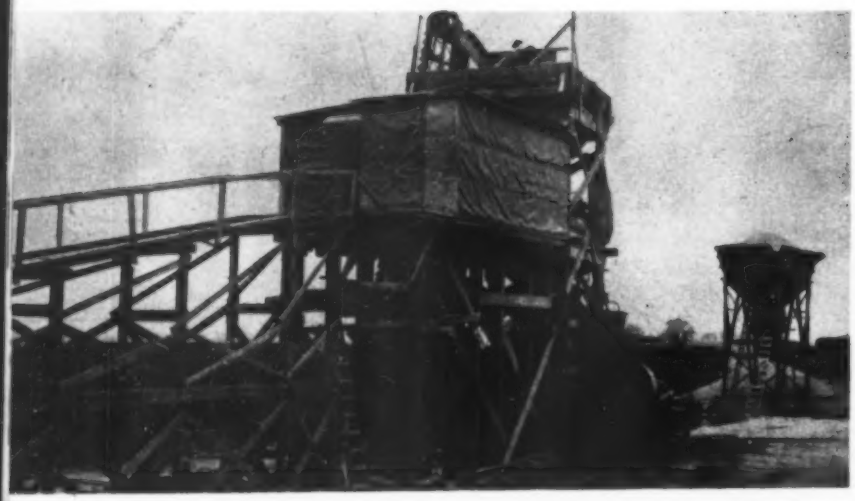
CONCRETE CAPS over tops of steel H-piles for aircraft carrier pier at Quonset Point (R.I.) Naval Air Station are poured with aid of corrugated metal forms covered with special drums into which steam is fed to insure proper cold-weather curing of concrete.

STOUT STAIRWAY bolted to outside of 75-ft.-high lock wall at Pinopolis Dam by Central Engineering Co., contractor, Davenport, Iowa, is one factor aiding maintenance of low accident record by South Carolina Public Service Authority on Santee-Cooper project.

EXCAVATING AND LOADING (below) of disintegrated granite used for road surfacing at Friant dam, in California, is handled at quarry by Sargent overhead loader rigged on Cletrac tractor. Tractor crowds bucket against bank and then backs away while bucket swings overhead to discharge load into waiting motor truck.

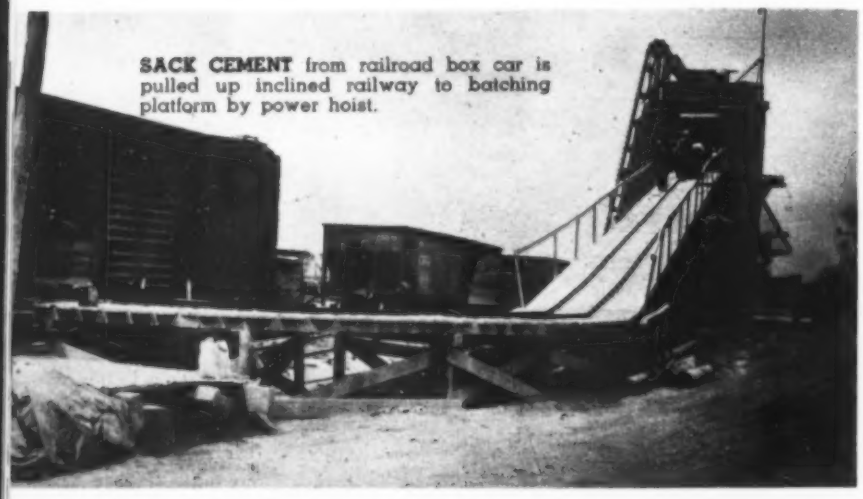
ARMY PUSHES COMPLETION OF

Southeast Air Depot



TRACKSIDE MIXING PLANT. supplied with aggregates from railroad hopper cars by under-track conveyor and bucket elevator, charges truck mixers with concrete for delivery to two buildings in Foster & Creighton contract.

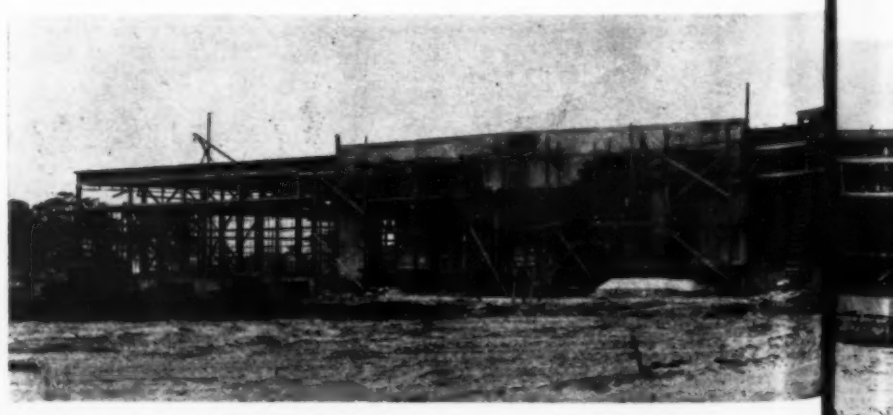
STEEL FRAME in two-story section of depot supply building is fireproofed construction bridge over which truck mixers travel on their way to engine



SACK CEMENT from railroad box car is pulled up inclined railway to batching platform by power hoist.

GAS MAIN PIPE (below) in 20-ft. lengths is electrically welded into 100-ft sections on timber supports over trench.

EACH FREIGHT-HANDLING WING of depot supply building has reinforced-

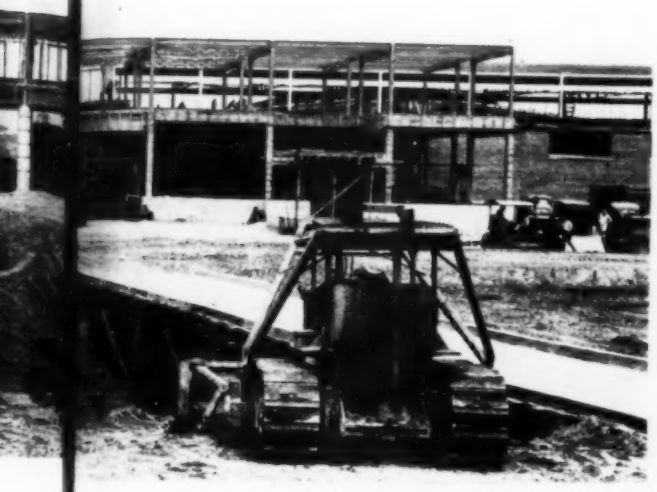


FLAT-ROOFED STEEL-FRAME BUILDING for engine repair shop requires and exterior walls around doorways and below steel sash.

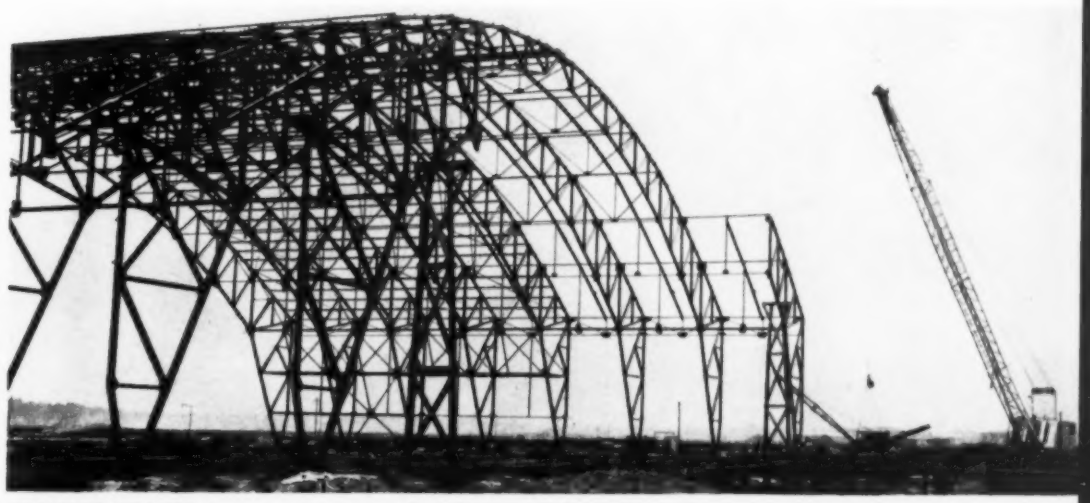
BY TAKING OVER THE FORMER MUNICIPAL AIRPORT at Mobile, Ala., and enlarging the area to include frontage for a water terminal on Mobile Bay, the War Department created a 1,361-acre site, known as Brookley Field, for its Southeast Air Depot, now being rushed to completion by contractors and government forces to permit full operation this year. The depot is designed to provide a complete plant, including shops and warehousing facilities, for servicing and repairing all types of aircraft of the Army based in the southeastern part of the United States. Started as a permanent project in advance of the emergency program, construction of the depot has been financed out of regular War Department appropriations, and contracts for buildings have been awarded after taking competitive bids.

Permanent buildings being erected by lump-sum contractors are rapidly approaching completion, and the work is being pushed under the direction of the U. S. Engineers in accordance with a plan to put all permanent facilities in operation by December. Some temporary barrack buildings have been added to the project as a result of the defense emergency, and the schedule calls for completion and occupancy of these buildings during 1941.

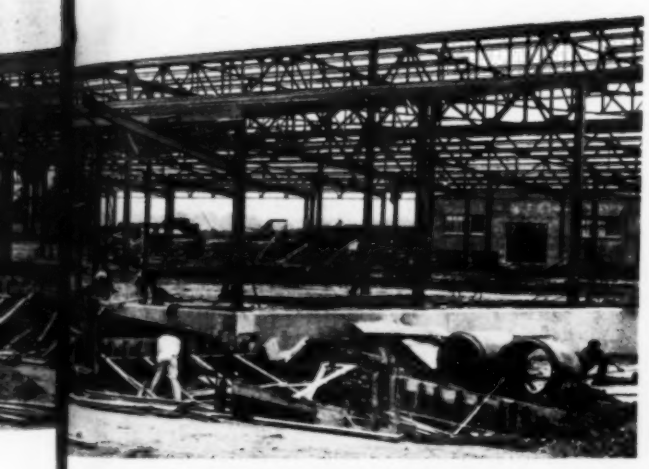
In addition to contract work on permanent buildings, the U. S. Engineers are directing other operations (such as



with concrete incasement. In right foreground is repair shop.



CRAWLER CRANES first place steel members for assembly into truss units on ground and later raise assembled sections into three-hinged arch trusses of hangar. Haunch sections are supported by timber falsework bents.

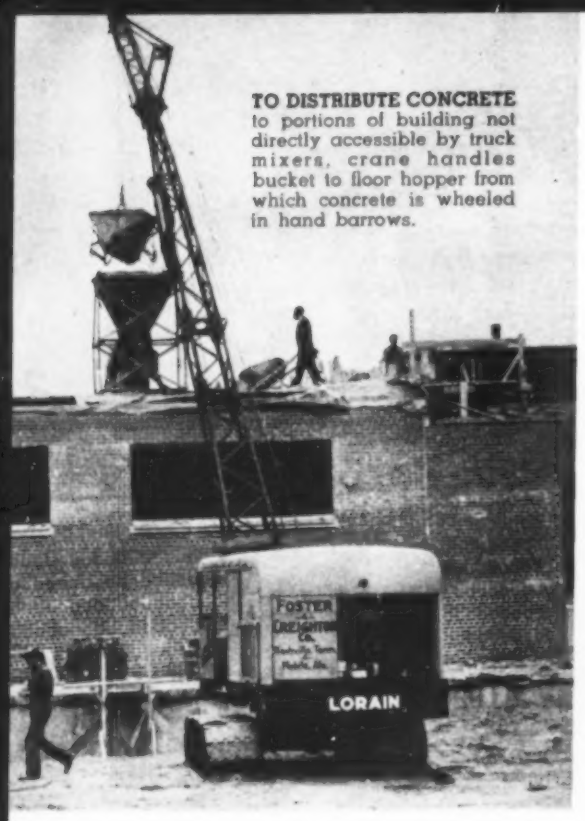


concrete loading platform paralleling track.

TRUCK-POWERED HOIST DERRICK sorts and hauls steel on job. In background crawler crane shifts steel members in storage yard.

TRUSS SECTIONS (below), as indicated by unit set up on blocks in foreground, are assembled and riveted in flat position prior to erection by crawler crane.

large volume of concrete for foundations, floors



TO DISTRIBUTE CONCRETE to portions of building not directly accessible by truck mixers, crane handles bucket to floor hopper from which concrete is wheeled in hand barrows.

MOBILE TOWER-MIXER UNIT serving A. J. Rife Construction Co. on hangar contracts is mounted on truck for easy portability. Power take-offs from truck engine operate: (1) hoist skip for charging 2-yd. mixing drum, (2) mixer and (3) ½-yd. tower hoist bucket delivering to hopper.

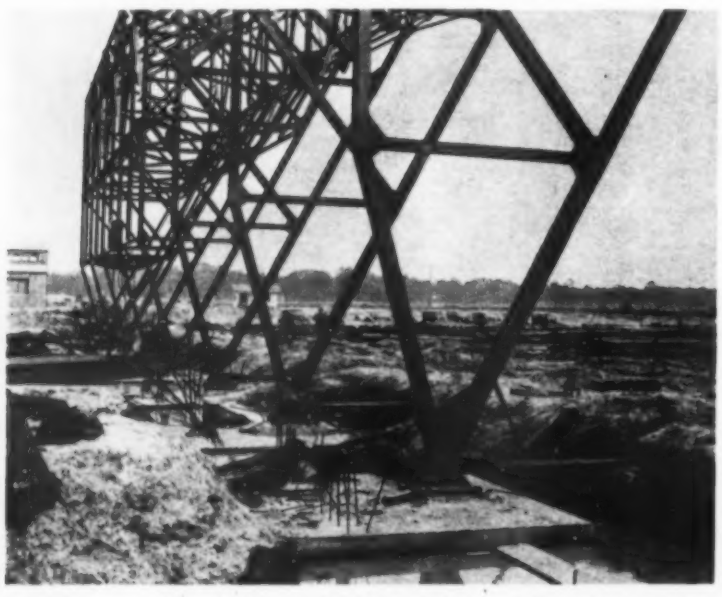
TO PROVIDE VISIBILITY when mobile plant is being driven from one site to another, section of inclined ramp is tilted and fastened in open position to expose windshield and headlamps. Hoist skip must first be raised to position above mixer. For long moves, tower is dismantled.

OPERATOR ON SIDE PLATFORM controls charging skip, mixing drum and tower bucket feeding adjustable hopper.

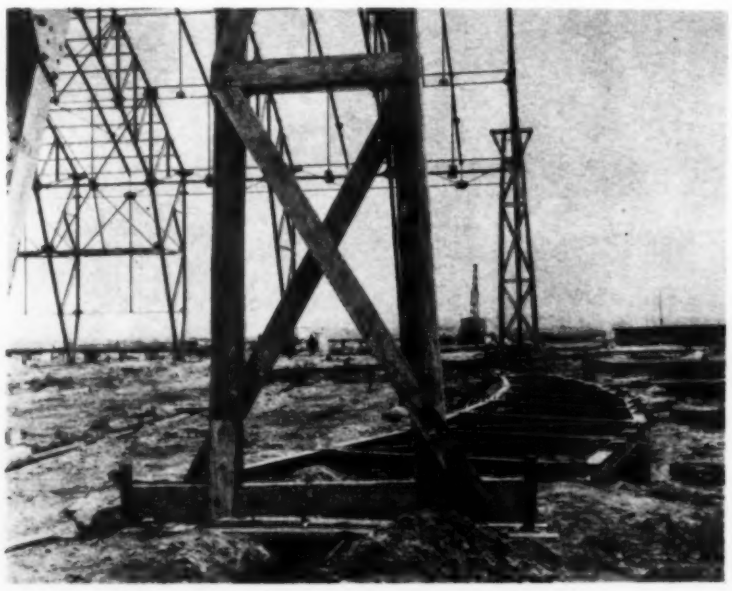
grading and utility construction) performed by WPA forces and by direct labor. The value of all work completed or under construction is about $7,600,000, and eventual completion of the depot, with all its facilities and airfield as planned, will involve a total expenditure of $11,600,000. Important permanent structures now being completed include a depot supply building, an engine repair shop, two operations hangars, an aircraft repair shop which incorporates other hangars, and additional shops and buildings. All forces on the project normally work a single shift, 40 hr. per week, except in rare emergencies.

Building Contracts—Early in August, 1940, the Foster & Creighton Co., Nashville, Tenn., received a $1,433,000 contract for two large structures, the depot supply building and the engine repair shop. During the following two months, the A. J. Rife Construction Co., Dallas, Tex., was awarded two contracts totaling $2,210,000 for the aircraft repair shop and two operations hangars. Accompanying photographs illustrate construction work on these contracts and on other features of the project being

(Continued on page 109)



ARCHES are tied by double turnbuckle rods between haunch pins. Concrete footings rest on groups of creosoted timber piles.



USING FOOT LIFTS on two 15-ton-capacity ball-bearing screw jacks under sill of timber bent, erectors adjust haunch section to facilitate steel erection and final pin connection at crown of arch.

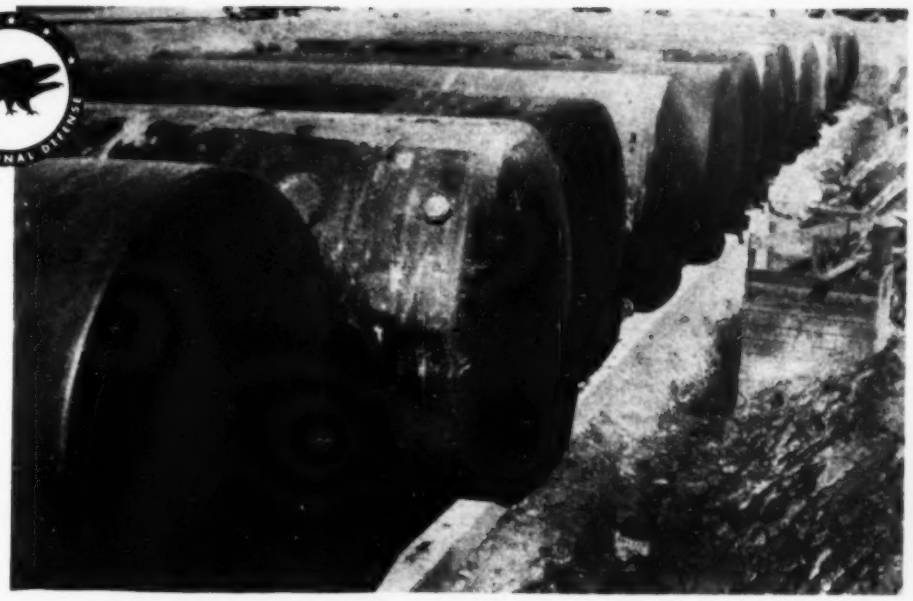
Melting Ice Cakes

Lower Gasoline Tanks At Army Airdrome

BLOCKS OF ICE were used to lower into place sixteen 25,000-gal. gasoline tanks which comprise the main portion of a new 400,000-gal. Army Air Corps gasoline fueling system being installed at the Salt Lake airdrome of the 5th Air Base, Salt Lake City, Utah.

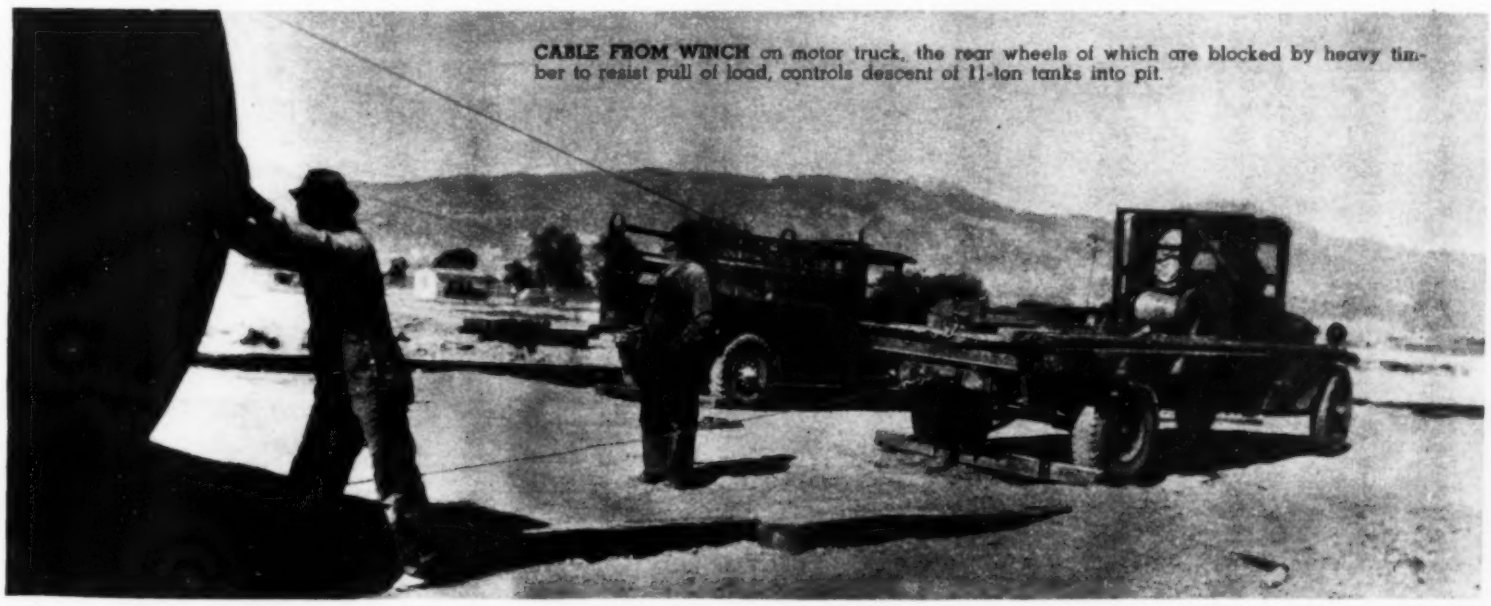
After delivery near the 15-ft. deep pit in which they were to be buried, the tanks were moved to the edge of the excavation and rolled down along inclined timber skids by cable from a winch on a motor truck, the rear wheels of which were securely blocked to resist the pull of the tank as it descended into the pit. Concrete slabs and saddles were constructed at the bottom of the 15-ft. excavation to receive the tanks after they had received a coat of red lead and three additional coats of asphalt paint. The tanks, each weighing 11 tons, empty, were first seated on wooden props, a few feet over the concrete bases, while the painting was being done. When the paint had dried, huge cakes of ice were placed under the tanks and the wooden props were removed. Gradually the ice melted away and the tanks settled into place.

The installation of the tanks was handled by the Central California Construction Co., of San Francisco, which held a $139,990 contract for the fueling system at the airdrome. The accompanying photographs were taken by Clinton A. Dailey, construction superintendent. Captain R. C. Kyser is acting constructing quartermaster on the project.



BLOCKS OF ICE are placed under tanks after they are sprayed with four coats of paint while carried by wood blocking 2-3 ft. high. Then temporary wood blocking is removed, transferring load to ice cakes which melt and allow tanks to settle gently into place in concrete saddles.

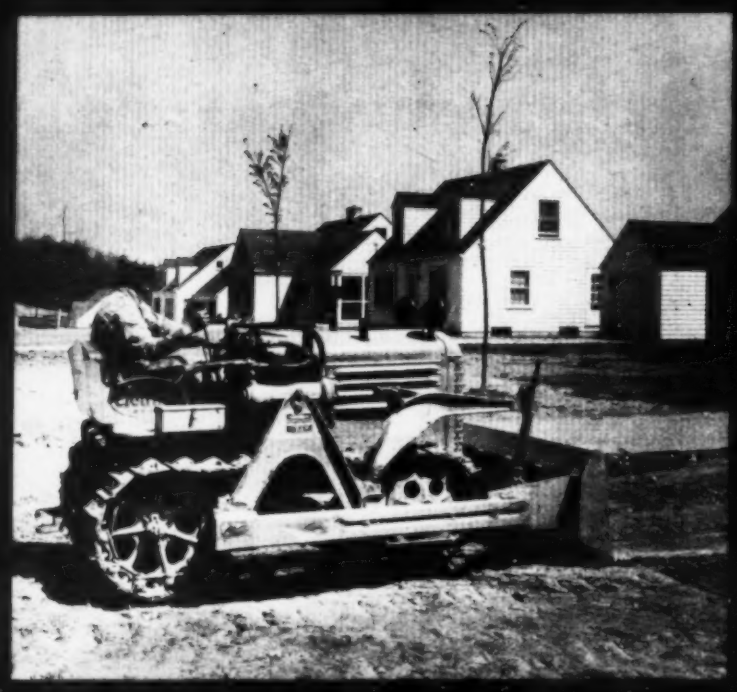
GOING DOWN! One of big steel tanks is rolled along inclined timber runways to temporary support on wood blocking 2-3 ft. above concrete base. Rolling is controlled by cable from winch on motor truck. Wood blocking supports tanks 2 to 3 ft. above concrete base to enable painting job to be done before final lowering.



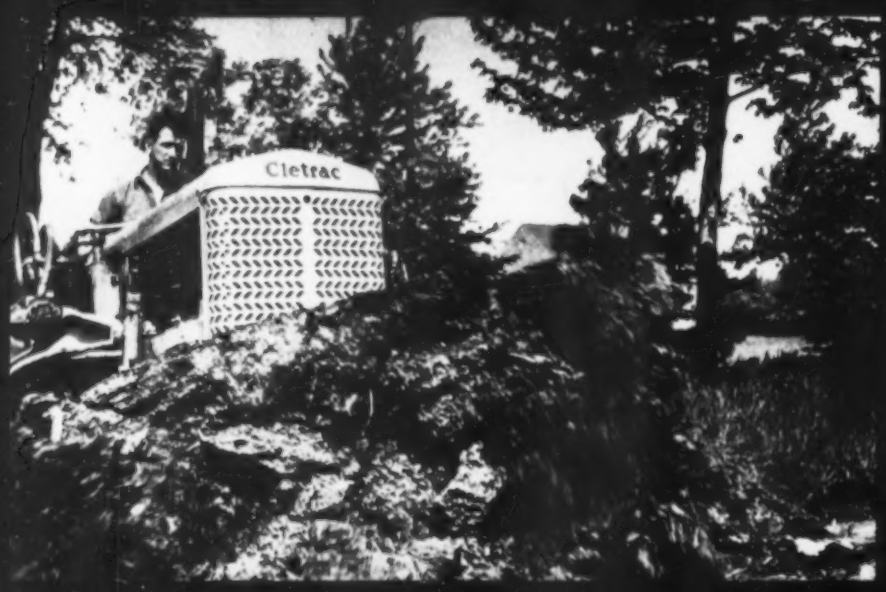
CABLE FROM WINCH on motor truck, the rear wheels of which are blocked by heavy timber to resist pull of load, controls descent of 11-ton tanks into pit.

CLETRACS dig it

The start of an excavation with BD Cletrac and Heil Bulldozer attachment

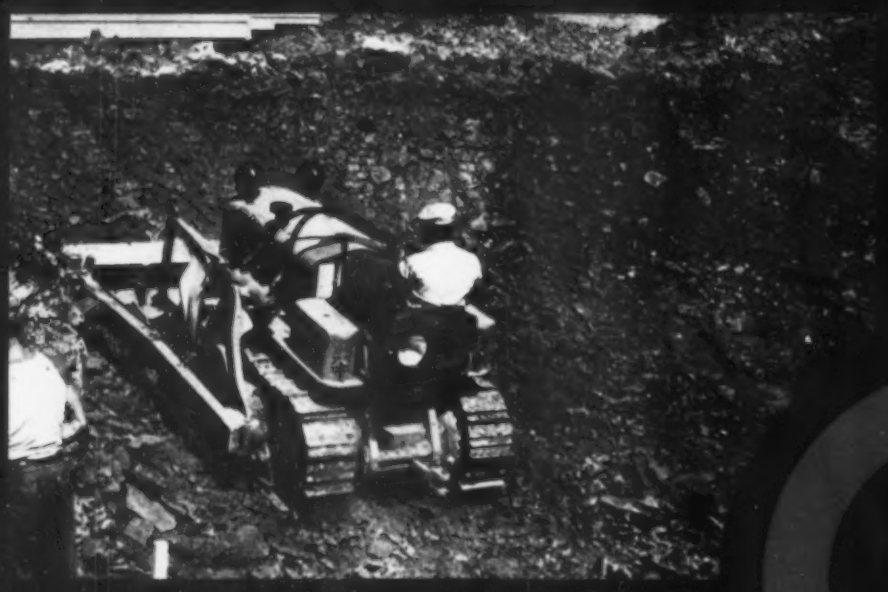


Finish Grading operation with AG Cletrac and Heil Bulldozer



BD Cletrac with Heil Bulldozer takes another bite on the above excavation

Cletrac BG equipped with Sargent Shovel working on house excavation



couple of hours later BD Cletrac and Heil Bulldozer nearing the completion of the excavation

CLETRAC

...the foundations for America's vital housing jobs...

Cletrac BD with Hydraulic Front End Loader on a house foundation job

Cletrac BD with Hydraulic Front End Loader loaded ready to discharge

Cletrac BD with Hydraulic Front End Loader preparing to dump into waiting truck

● National Defense is a big job requiring huge investments for large equipment but we cannot lose sight of the smaller jobs that are equally important to the ultimate aims of defense. These jobs require the use of smaller, mobile units for economical earth moving.

Offhand — digging foundations and basements sounds like an everyday job. However, in times like these housing projects are vital to the final success of the defense program.

Cletracs have been used in digging basements for the past 25 years and today with their modern construction and versatile attachments are speeding homes to rapid completion for the millions of workers employed in emergency operations.

Contractors responsible for basement and foundation excavation find Cletracs handle more jobs quickly — from actual excavating to finish grading. Two house basements a day in average going is an indication of the speed and economy you can expect of the smaller Cletrac Tractors.

— and for the large jobs there are Cletracs up to 96 H.P. (Gasoline or Diesel) that are just as efficient and economical.

ONLY CLETRAC GIVES YOU
*TRU-TRACTION

*TRU-TRACTION IS POWER ON BOTH TRACKS AT ALL TIMES

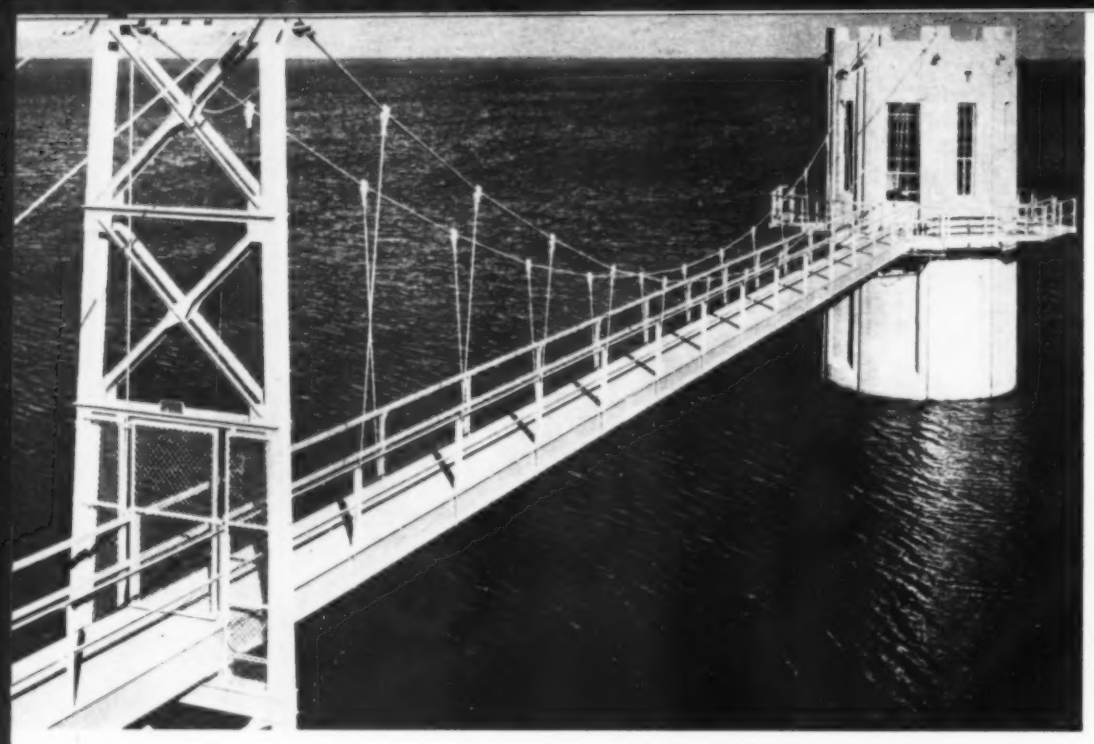
THE CLEVELAND TRACTOR COMPANY

CLEVELAND, OHIO

25th Anniversary 1916 - 1941 CLETRAC CRAWLER TRACTORS

CRAWLER TRACTORS

14 to 96 H.P. GASOLINE OR DIESEL



LAKE MATHEWS, with outlet tower and connecting bridge in foreground, is terminal storage reservoir on main aqueduct line. Initial storage capacity is 34,000,000,000 gal. Water from this lake passes through softening and filtration plant 35 mi. distant.

FRANK E. WEYMOUTH, general manager and chief engineer of the Metropolitan Water District of Southern California, who directed aqueduct project until his death on July 22.

ADMINISTRATION BUILDING and headhouse at softening and filtration plant is imposing concrete structure 120 ft. high.

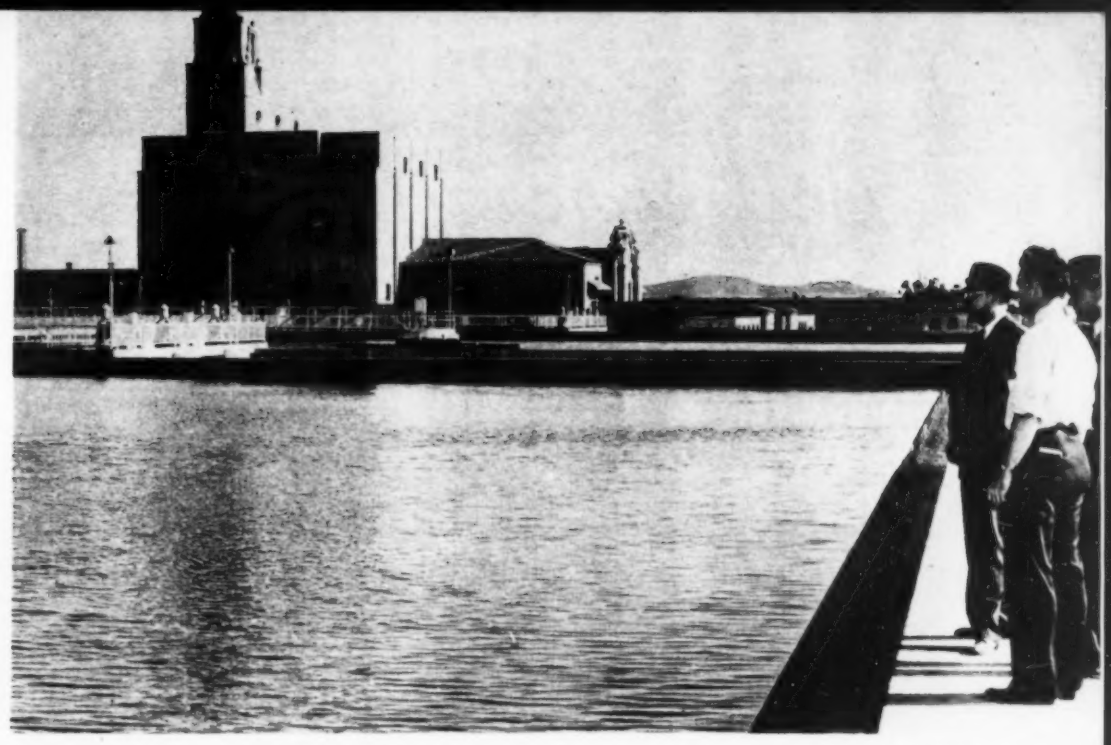
Colorado River Aqueduct

Begins Delivery to Southern California's 13-City Water District

CONCRETE LINED CANAL SECTION (below) of aqueduct carries Colorado River water westward to 13 California cities. Standing at left is late Frank E. Weymouth, chief engineer and general manager.

COPPER BASIN SIPHON (right), a 16-ft.-diameter reinforced concrete tube across deep ravine between two tunnels, is one of spectacular features of 392-mi. main aqueduct and distribution system

JULIAN HINDS, assistant chief engineer, who was promoted to the office of chief engineer and general manager to fill vacancy created by death, July 22, of Frank E. Weymouth.



FIRST WATER FROM COLORADO RIVER fills large settling basin at softening and filtration plant. In each of two basins, 200x200 ft. in plan, water is 20 ft. deep.

AFTER MORE THAN EIGHT YEARS of uninterrupted construction work over a 300-mi. front and with 38,000 men on the job from first to last, the giant Colorado River Aqueduct of the Metropolitan Water District of Southern California began the delivery of water June 17, when Pasadena had the distinction of being the first city on the coastal plain of Southern California to receive water from the Colorado River. Financed in 1931 by a $220,000,000 bond issue, the huge water supply project actually cost only $198,000,000, or about $22,000,000 less than the bond issue cost estimate.

Surveys for the aqueduct were begun in 1923 by the City of Los Angeles under the direction of William Mulholland. As these studies progressed, it became more

(Continued on page 108)

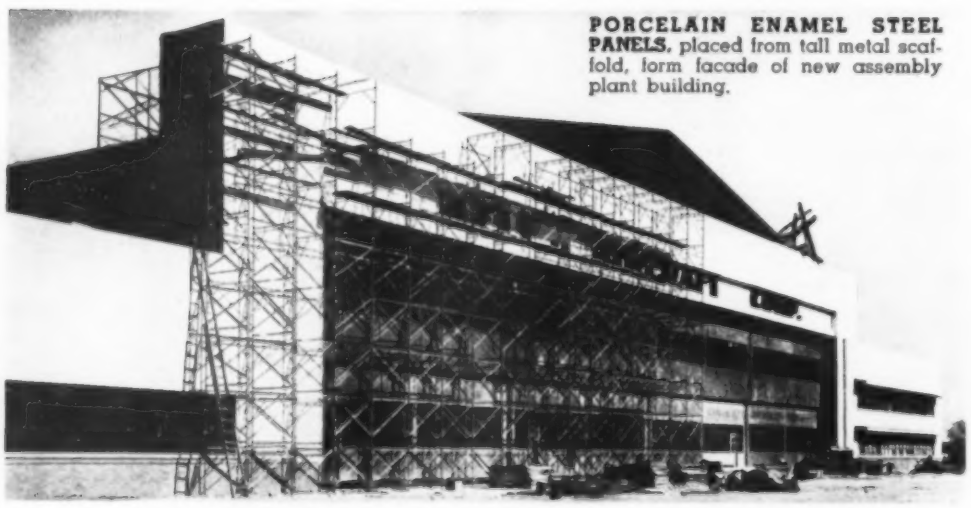
INTAKE PUMPING PLANT raises Colorado River into Lake Havasu from which it starts its journey to 13 cities in Southern California's coastal plain.

EAGLE MOUNTAIN PUMPING PLANT (below) is one of five pumping plants that lift Colorado River water a total height of 1,617 ft. in crossing mountain barriers on aqueduct line.

Bell Aircraft Plant

Includes 600x400-Ft. Assembly Building With 200-Ft. Trusses

LARGE STEEL TRUSSES of 200-ft. span and 38-ton weight, supporting roof of 600x400-ft. aircraft assembly plant, are erected in halves by long-boom crane.



PORCELAIN ENAMEL STEEL PANELS, placed from tall metal scaffold, form facade of new assembly plant building.

SHORTLY AFTER AIRACOBRAS for the U. S. army Air Corps began rolling off conveyorized production lines in the new 600x400-ft. assembly plant recently completed by The Austin Co. for the Bell Aircraft Corp. at Niagara Falls (N. Y.), Airport, authorization for expanding the plant from 240,000 to more than 950,000 sq.ft. of space was announced by the Defense Plant Corp. The new authorization covers an $8,456,175 project, including machinery, to increase fighter plane production capacity. The newly built factory at Niagara Falls, will be increased by 550,000 sq.ft. in addition to the construction of hangar building, boiler house, shipping and storage buildings and garage.

200-Ft. Steel Trusses

The plant just completed and put into operation required 2,000 tons of structural steel, including eight 200-ft. trusses weighing 38 tons each, and a 45-ton truss to support four 50-ft. overhead canopy doors that provide a 200-ft. opening, 30 ft. high, through which planes move off the production lines on to the apron. Buff face brick and limestone used throughout most of the exterior has been varied on the airport facade where contrasting red brick has been used below the windows and where the entire hangar door area is framed by panels of buff porcelain enamel. Massive 4-ft. block letters in blue porcelain enamel have been recessed above the canopy doors and clearly identify the plant.

Offices are located in the southwest corner where curves and angles have been combined to provide interesting modern detail at the entrance. Fixed "awnings" in the form of steel fins extend out from the walls above continuous sash at two levels in this section, as protection against the sun. Thirty-five individual offices have been provided in this section, where an area of 10,000

sq.ft. has been partitioned with removable steel panels which afford absolute privacy but can be shifted about, if necessary, when conditions change.

The roof was designed to provide the maximum of insulation, summer and winter. It has 2½ in. of reinforced gypsum, poured in place over 1-in. insulating board, which rests on 15-lb. rails that were welded to the steel purlins. This deck was covered with a 20-yr. tar and gravel bonded roofing.

A 5-in. reinforced concrete floor slab has been provided over the entire working area and was finished with a metallic hardener floated into the wearing surface.

Sprinklers installed throughout the plant for fire protection are supplemented in the hangar area by a deluge curtain, consisting of metal baffles within the trusses around this area and special sprinkler heads which provide a sheet of falling water sufficient to isolate any blaze. Water flow indicators on each of the plant's eight sprinkler risers are equipped with electric gongs to give alarm in case of fire.

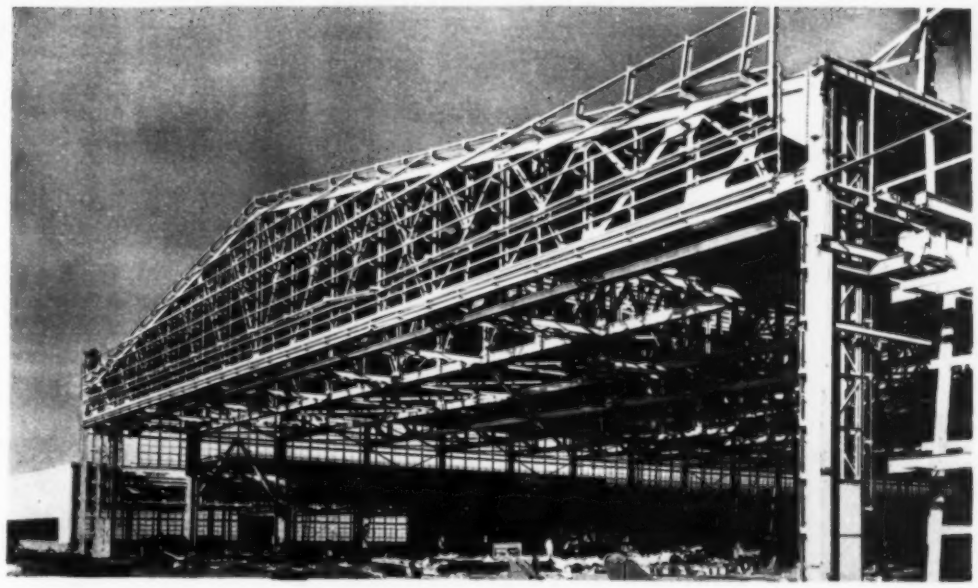
Other Improvements

Other improvements on the 66-acre fenced-in site include a 90,000 sq.ft. concrete apron and ramp adjoining the plant alongside the airport, where 50 recessed steel anchor rings have been installed for fastening down planes awaiting test flights; a boiler house with two 300-hp. oil-fired boilers and equipped with one 350-c.f.m. air compressor; factory parking facilities for 1,700 cars and a separate 200-car parking area for guests, executives, Army officers, and office personnel.

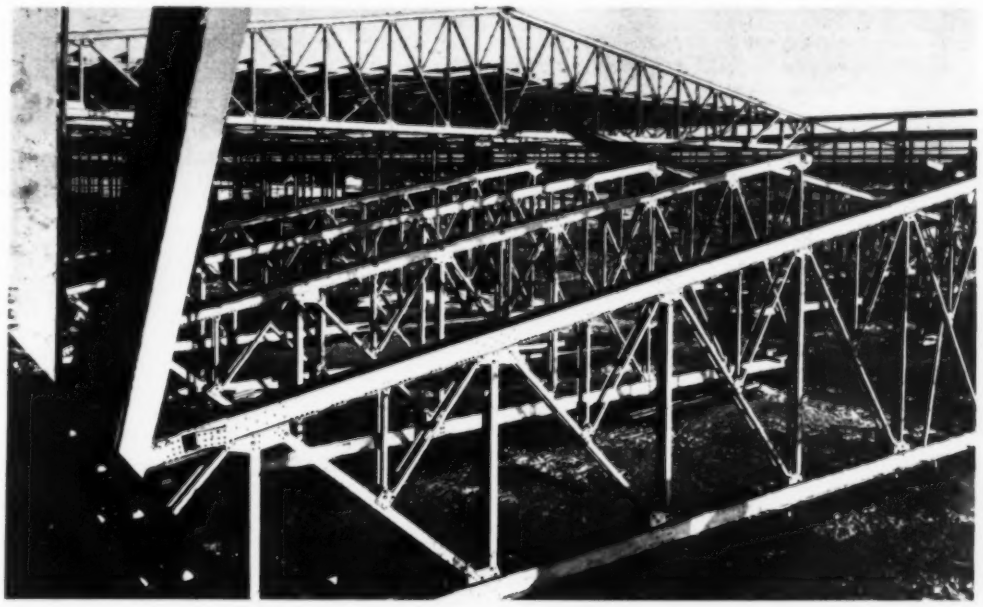
Service Ducts

A network of underfloor service ducts carries 110-v. and high-cycle power facilities and compressed air to more

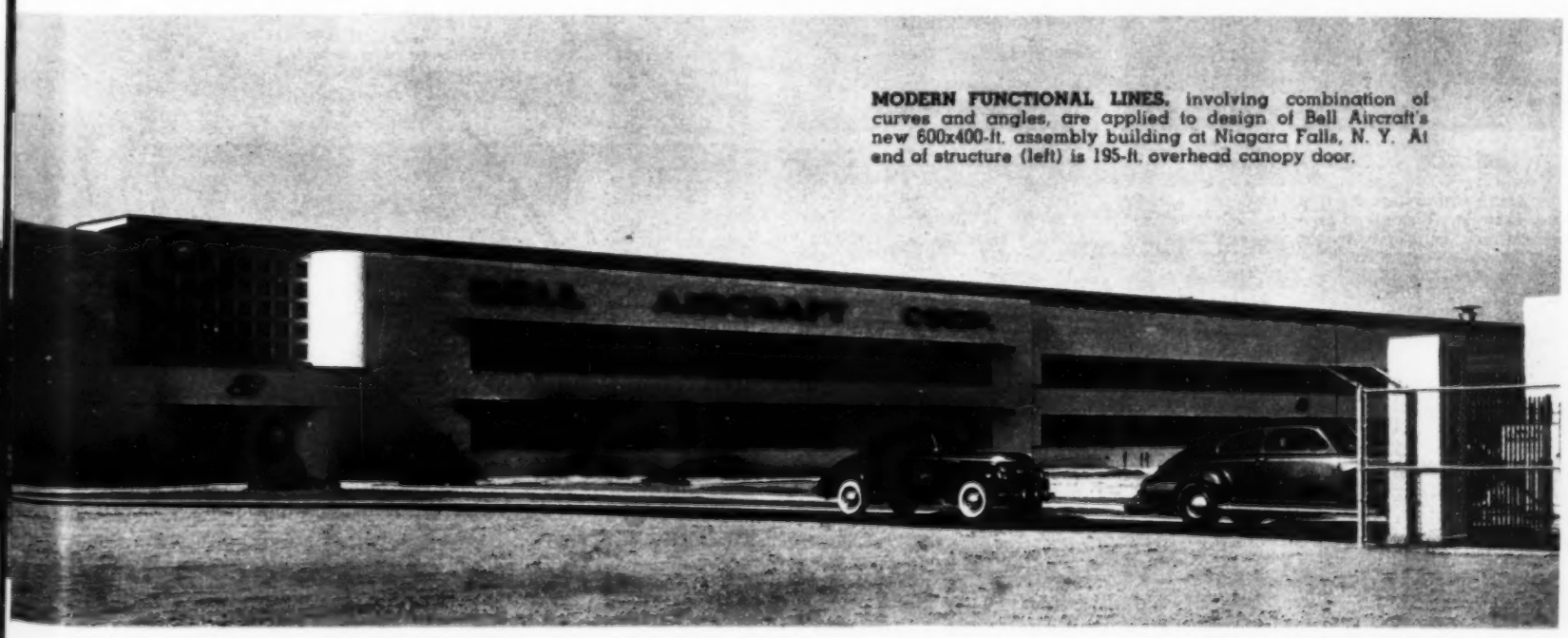
(Continued on page 106)



SPANNING 200 FT. at end of building is 45-ton steel trusses which will carry four 50-ft. overhead canopy doors covering opening through which completed planes will move off assembly lines on to 90,000-sq.ft. concrete apron.



AWAITING ERECTION on ground are halves of four 200-ft. steel trusses, each weighing 38 tons.



MODERN FUNCTIONAL LINES, involving combination of curves and angles, are applied to design of Bell Aircraft's new 600x400-ft. assembly building at Niagara Falls, N. Y. At end of structure (left) is 195-ft. overhead canopy door.

ARMY CANTONMENT CONSTRUCTION at Aberdeen Proving Ground in Maryland is handled by this group of key men (left to right): A. O. LEIGHTON of Irwin & Leighton, contractors for work; LT. COL. GEORGE W. OUTLAND, commandant, Ordnance School; LT. COL. S. W. McILWAIN, former constructing quartermaster for project and now zone constructing quartermaster at Boston, Mass.; MAJ. ROY C. GREGORY, constructing quartermaster; C. P. HOFFMAN, project engineer, C.Q.M.; FRANK ROLLER, project manager for Irwin & Leighton; and FRANCIS S. FRIEL of Albright & Friel, Inc., consulting engineers for job.

Present and Accounted For

A PAGE OF PERSONALITIES

NEW DIRECTOR of Illinois Department of Public Works and Buildings is WALTER A. ROSENFIELD, appointed to post by Governor Green early this year. Mr. Rosenfield was formerly treasurer and general manager of Rock Island Bridge and Iron Works.

PUSHING HIS JOB with as much ease as he handles a cart, HARRY ROMMEL, superintendent for George H. Rommel Co., Louisville, Ky., keeps progress ahead of schedule on $1,300,000 project at Jeffersonville (Ind.), Quartermaster Depot.

APPOINTED DIRECTOR of Building Construction and Maintenance for Westinghouse Electric & Mfg. Co., GEORGE PARKMAN **(left)** is in charge of eleven new building projects, including newly completed fluorescent lamp plant in Fairmont, W. Va.

TRAINING-WITHIN-INDUSTRY BRANCH of Office of Production Management, Washington, D. C., enlists services as Peoria (Ill.) district representative, of K. P. CROWELL, factory training manager of Caterpillar Tractor Co. Purpose of organization, with 22 local districts throughout U.S., is to help national defense contractors and subcontractors obtain trained workers and supervisors through program of apprentice training and specialized work.

CREATOR OF TRACTOR SUPERSALESMAN, Alexander Botts, whose amusing exploits for Earthworm Tractor Co. have been featured in articles in "Saturday Evening Post," is WILLIAM HAZLET UPSON, shown here in driver's seat of Caterpillar D7 tractor at company's Peoria (Ill.) plant, where he is conferring with Bob Terhune, of advertising department, regarding material for new national defense story.

Double-Quick DUMPING and SPREADING

Koehring 34-E Unibatch Paver can swing boom to 90 degree angle when conditions require right angle pouring. Bucket can travel to end of boom for maximum spreading area.

TWIN RIBBONS OF CONCRETE

Twin doors, both *opening same direction* on Koehring boom buckets provide Double-Quick Dumping and Spreading. Twin ribbons of concrete are spread on the grade. Action is instantaneous . . . large Twin-door opening is approximately 13 square feet. Full width of bottom is used for door opening. No choking at bucket door, even with dry or harsh concrete.

Bucket shaking is not necessary. Bucket is big enough to carry full overload batch in one trip. Seconds saved when dumping and spreading cut batch cycle time. Koehring Twinbatch and Unibatch 34-E Pavers are equipped with Double-Quick Dumping and Spreading Twindoor buckets.

KOEHRING COMPANY
MILWAUKEE • WISCONSIN

KOEHRING HEAVY DUTY

HEAVY-DUTY CONSTRUCTION EQUIPMENT

LOOK FOR THE "SERVICE-PROVED" SEAL — tagged only on Blackhawk Hydraulic Jacks. It's your assurance that you are getting DEPENDABILITY, PERFORMANCE, MORE JACK VALUE PER DOLLAR. The "Service-Proved" Seal is backed by years of top-notch performance for over a million Blackhawk Hydraulic Jack owners—including those in every phase of construction and engineering work.

Remember—there's as much difference in jacks as in watches — and a jack at any price is worthless unless it continues to serve its purpose in every emergency. Get "Service-Proved" Blackhawk Hydraulic Jacks from your Industrial Supply Distributor — *and write for new Catalog 41H.*

A Product of **BLACKHAWK MFG. CO.**
Department J2391 **Milwaukee, Wis.**

BLACKHAWK
WORLD'S LARGEST MANUFACTURER OF HYDRAULIC JACKS

BLACKHAWK MFG. CO., Dept. J2391, Milwaukee, Wis.

Send new catalog featuring Blackhawk Hydraulic Hand Jacks, Gauge-Equipped Jacks, Porto-Power Remotely Controlled Jacks, Pipe Benders and Wrenches.

Name.....

Company.....

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CONSTRUCTION EQUIPMENT NEWS

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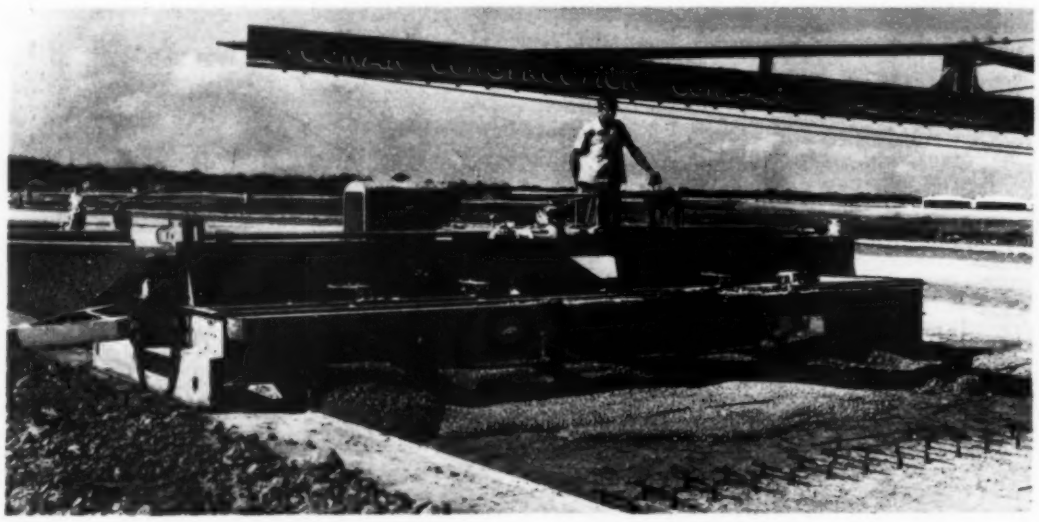
Review of Construction Machinery and Materials for SEPTEMBER, 1941



GASOLINE-DRIVEN FINISHING MACHINE is said to have greatly increased flexibility due to provision for six traction and four screed speeds which enable unit to give satisfactory service with any texture of concrete or type of paving. On harsh concrete, for example, it is said to be entirely feasible to operate traction at slow speed and screeds at one of higher speeds in order to get superior finish. Unit is equipped with power-operated hydraulic screed lifts. Short lever raises and lowers screeds. Six traction speeds, covering both forward and reverse operation, include four working speeds and two travel speeds. For narrow machines working speeds are 9, 12 15 and 20 ft. per minute; travel speeds, 95 and 125 ft. per minute. For wide machines working speeds are 7½, 10, 12½ and 16½, and travel speeds are 76½ and 102 ft. per minute. Screed speeds in narrow machines and 56, 69, 75 and 92 strokes per minute. For wider machines, screeds can operate at 48, 60, 63 and 79 strokes per minute. Length of screed stroke is adjustable from 6 to 11 in. Other features: (1) automotive type of transmission; (2) traction wheels with removable rims; (3) newly designed spring steel wheel cleaners; (4) spring shock absorbers for front and rear screeds; (5) truck for transportation from job to job. Attachments available. Quick, adjustable front screed for rapid transition from crown to flat and back to crown; tamper; vibratory attachment; belter; hinged strike-off plate; curve widening device; special attachments for asphalt paving. — **Blaw-Knox Co., Blawnox, Pa.**

★ ★ ★

GLUE GUN, lightweight and said to be easy to propel, holds 2-qt. of wet glue—enough for 408 lin.ft. of studding—and dispenses 1-in. glue line. If self-bonding, water-resistant glue is used, narrow ribbons, upon slightest even pressure, will provide permanent bond between 2x4's and wall boards. This pressure may be obtained on job either by use of double-headed nails removable after glue has set or with press equipment. Carefully regulated doctor bar on gun in combination with corrugated roll at nose of machine assures uniform flow no matter which way gun is tipped or whether it is full or nearly empty. Advantages: (1) Glue waste is almost entirely eliminated; (2) labor costs reduced; (3) uniformity of glue application; (4) ease of cleaning.—**I. F. Laucks, Inc., Maritime Building, Seattle, Wash.**

★ ★ ★

WIRE ROPE CLAMP, made of high tensile strength alloy steel forgings and coined to accurate dimensions, consists of four parts. Two taper threaded sections are placed on exposed sides of rope and squeezed together in vise-like grip and two taper nuts are tightened, gripping rope with strength said to be greater than that of rope itself. By eliminating splicing and serving, this clamp is said to reduce cost of loop or sling because it takes less time to

"Gulf helps do a speedier, more profitable job"

. . . says contractor on airport project *

"With Gulf quality lubricants and fuels in service, we get efficient performance from our equipment and avoid unnecessary delays. Result: We're well ahead of contract schedule — and have an excellent cost record."

*Mauger Construction Company of Columbus, Ohio, and Charleston, West Virginia, and the Samons Construction Company (associated with the foregoing) of Huntington, West Virginia, are ahead of schedule on this huge airport project at Cumberland, Maryland. Gulf lubricants and fuels are helping them attain an efficient operating record.

"WITH Gulf quality lubricants and fuels in service, we're getting efficient, trouble-free performance from our equipment on this airport project," says this contractor. "In addition, our operating and maintenance costs are low — so, thanks to Gulf, we're doing a speedier, more profitable job."

Are you entirely satisfied with the recent operating record of *your* equipment? If not, make sure that on your next job you get the benefits of Gulf quality lubricants and fuels. They are quickly available to you through more than 1200 warehouses in 30 states from Maine to New Mexico. Write or 'phone your nearest Gulf office today.

GULF

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GULF REFINING COMPANY
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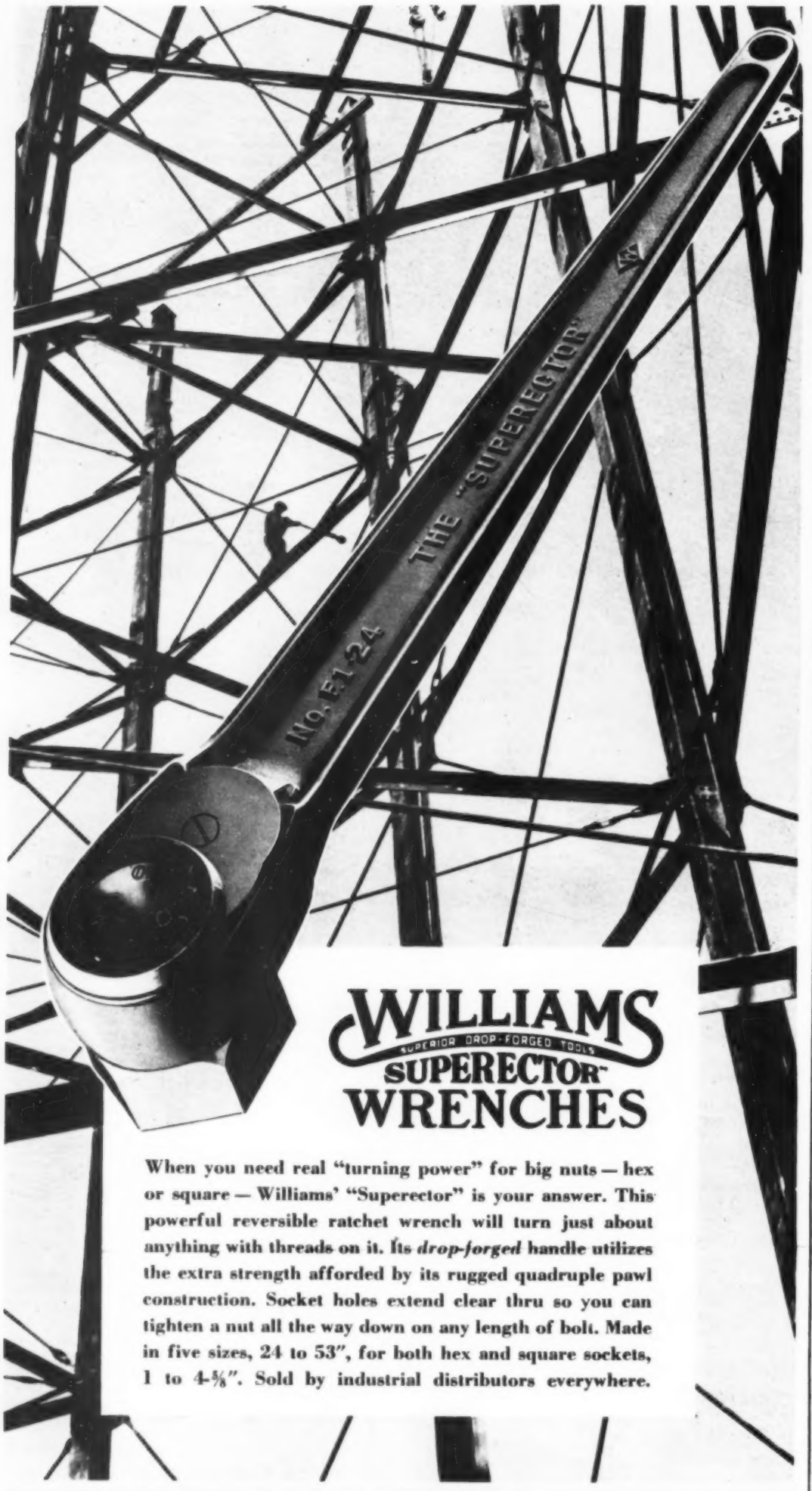


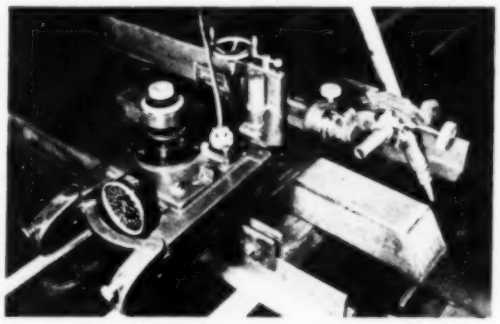
WILLIAMS
SUPERIOR DROP-FORGED TOOLS
SUPERECTOR
WRENCHES

When you need real "turning power" for big nuts — hex or square — Williams' "Superector" is your answer. This powerful reversible ratchet wrench will turn just about anything with threads on it. Its *drop-forged* handle utilizes the extra strength afforded by its rugged quadruple pawl construction. Socket holes extend clear thru so you can tighten a nut all the way down on any length of bolt. Made in five sizes, 24 to 53", for both hex and square sockets, 1 to 4-5/8". Sold by industrial distributors everywhere.

make up and does not require skilled workman to handle job. Illustration shows Ford hoist truck loading 1,000-lb. bombs into bombing racks. Safe-line wire rope clamps were used in this operation.—**National Production Co., Safe-Line Clamp Div., 4561-4603 St. Jean Ave., Detroit, Mich.**

★ ★ ★

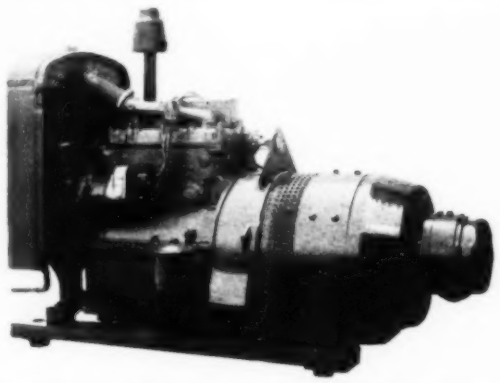
PROTRACTOR-TYPE TORCH HOLDER with 90-deg. angle range is now available for use in setting standard Airco Radiagraph cutting torches for any desired angle of cut and is said to enable operator



to do this work with convenience and accuracy. Bevel cut billet is shown in photograph. Circular knurled knob permits angular adjustment as indicated on scale.—**Air Reduction Sales Co., 60 East 42nd St., New York City.**

★ ★ ★

THREE NEW LIGHT PLANTS, low speed, 1,200-r.p.m. models, have been added to Katolight line in sizes 5,000, 7,500 and 10,000 watts, available with either two or three wire service or three phase, at 60 cycles. Generators are of revolving armature type, generator frame being mounted directly to engine



bell housing. Furnished both with separate exciter attached to outer generator end-bell and also with exciter winding carried on main a.c. armature. Silicon steel armature laminations; pole pieces of laminated construction. Grease-sealed, cartridge-type ball bearings. Engine and generator assembly mounted on rubber, permitting installation of plant without bolting. Full automatic control for 5,000-watt size. Larger size available only with remote control. Unit powered by Le Roi 185-h.p., 4-cylinder, 4-cycle, water-cooled engine.—**Kato Engineering Co., Mankato, Minn.**

What kind of ROOTS has the Wire Rope YOU USE?

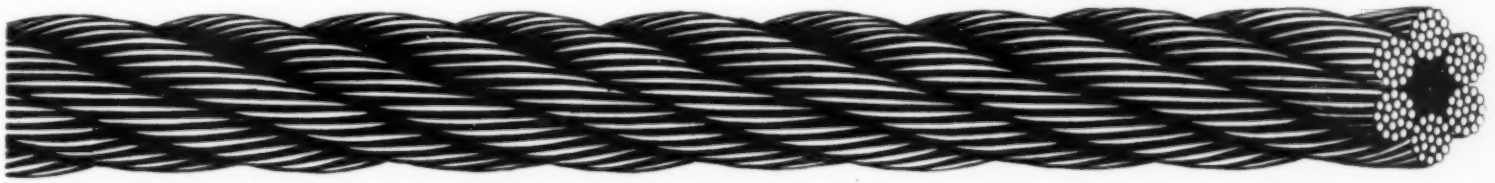
THE "ROEBLING 4" speak for themselves. Here are the roots from which Roebling "Blue Center" Steel Wire Rope has developed—the finest wire rope that money can buy.

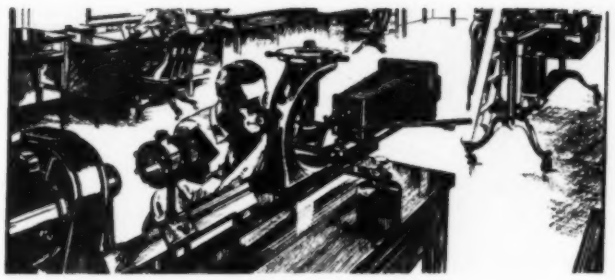
Profit from this unequalled combination of advantages. The use of Roebling "Blue Center" will assure you of rock-bottom *general average* rope operating cost.

ROEBLING

"Blue Center"
STEEL

WIRE ROPE





KEEPING AHEAD—BY LOOKING AHEAD!

There is nothing static about Roebling "Blue Center" Wire Rope. It is constantly being developed and improved. We keep it ahead—by looking ahead, with Research.

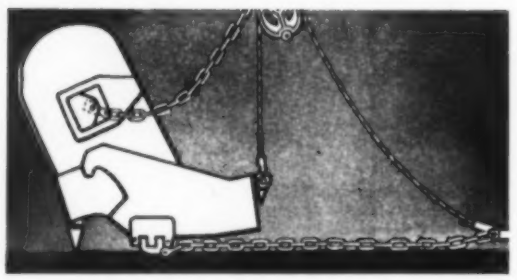
Roebling wire rope research is carried on continually, on a planned basis—in one of the country's most modern and completely equipped industrial research units.

ROEBLING 1841 1941 100th ANNIVERSARY

JOHN A. ROEBLING'S SONS COMPANY TRENTON NEW JERSEY

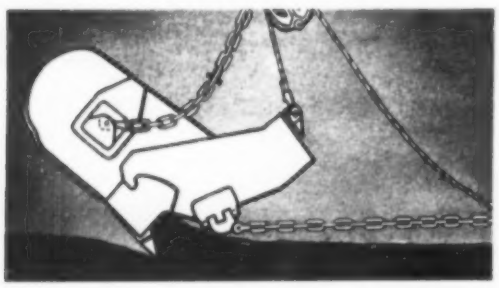
Branches in Principal Cities Export Division: 19 Rector St., New York, N.Y. U.S.A. Cable Address "Roebling's", New York

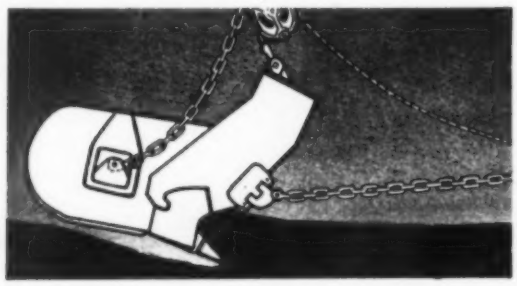
Here's What We Mean by AUTOMATIC DIGGING ACTION



1. PAGE *AUTOMATIC* BUCKETS ALWAYS STRIKE FIRST ON THE FORWARD ARCH. The special patented Page construction is the key to AUTOMATIC Digging Action. Because of it.....

2. PAGE BUCKETS "AUTOMATICALLY" ROTATE BACK ONTO THE TEETH AND ARCH, holding this position *with all lines slack*, eliminating jockeying and jerking. This means that.....





3. PAGE *AUTOMATIC* BUCKETS SOCK RIGHT IN —AT THE FIRST PULL OF THE LOAD LINE. Bearing down with ALL weight on the teeth . . . a Page starts digging NOW! The result is.....

4. PAGE *AUTOMATICS* HANDLE EASIER . . . GET THEIR FULL LOADS QUICKER—AT ANY DEPTH! They get a head start of other, slower types. They dig and carry more "pay loads" per shift than any other make of bucket equal in size and weight!

Here's What It Means To *YOU!*

A Page AUTOMATIC Bucket on YOUR DRAGLINE means MORE DIRT MOVED PER SHIFT! Operators all over the country—on all kinds of jobs tell us that just by switching to Page Buckets they've increased production 20% to 50%. Get in on this "gravy"—these EXTRA PROFITS. Put a Page AUTOMATIC Bucket on YOUR job and start cashing-in NOW. Let us give you full details. See for yourself what it can do for YOU. Fill out the coupon at the left and MAIL IT TODAY!

PAGE ENGINEERING CO. · CHICAGO, ILL.

PAGE *Automatic* DRAGLINE BUCKETS

Address this Coupon to:
DEPT. A-30, PAGE ENGINEERING COMPANY,
c/o Clearing Post Office, Chicago, Ill.

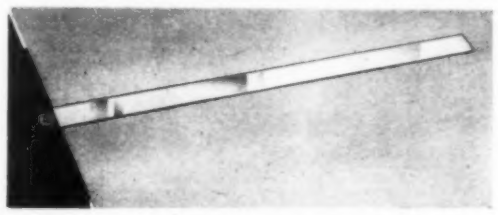
Without obligating me in any way, mail a copy of your new descriptive bulletin entitled "Your Dragline WILL Move Dirt Faster."

*Name*_____

*Street*_____

*City*_____ *State*_____

PLASTIC T-SQUARE, named Escolite, for use of draftsmen, artists and students, is particularly adaptable where it is desirable to view entire drawing without moving T-square. Outstanding features: use of modern plastics and patented removable head construction. Head of T-square is made of black laminated and Bakelite composition 5/16 in. thick. Blade is of Escolite, .090 in. thick, crystal clear, fully transparent plastic that is said not to discolor or



turn brittle and to retain transparency and accuracy indefinitely. These materials, made especially for purpose are claimed not to warp, bow, chip, crack or split. No finish to wear off, chip or peel. Eight cone-shaped pins are accurately and securely set into head. Pins engage corresponding openings on blade, eliminating wabble and automatically taking up play. No paper rabbet need be used because head is held 1/16 in. away from blade. Special die casting and single screw hold entire assembly together. This construction eliminates damage in shipping and provides for instant removal of blade for use as straightedge. When used as straightedge, no projections or fittings appear on either surface of blade to interfere with ease of operation and to injure drawings. Either head or blade may be replaced in case of breakage. Swivel head made to exact size and shape and of same material as fixed-head, may be added at any time.—**Engineering Sales Co., Sheboygan, Wis.**

★ ★ ★

LIGHTWEIGHT AIR HOSE, in ½- and ¾-in. sizes and made of oil-resistant rubber, is said to be so flexible that ½-in. size can be bent to 3-in. radius without collapsing or cutting off air supply. Strength and efficiency are said to be combined with minimum weight and ease of handling, appealing particularly to operators of pneumatic tools. Light gray

color assures sufficient visibility to prevent injury by trucks. Of two-braid construction, hose is said to be able to withstand working pressures of from 80 to 125 lb. Tube said not to flake nor clog tools. Yarn reinforcement affords safety factor of more than 5:1 under working pressure of 125 lb. Golden ply insulation has been especially developed to assure flexibility and resistance to kinking.—**The B. F. Goodrich Co., Akron, Ohio.**

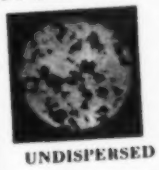
★ ★ ★

STRIKING FACE BOX WRENCH is said to be particularly adapted for work in close quarters where large nuts must be set up tight or "frozen" nuts loosened. Offset head provides ample nut clear-

ance. Available in ten sizes with 12-point openings 11/16 to 2¾ in., for U. S. Standard nuts ⅝ to 1¾ in. Drop-forged from chrome-molybdenum steel, properly heat-treated to withstand shock loads. Finished in baked gray enamel.—**J. H. Williams & Co., 225 Lafayette St., New York City.**

CEMENT DISPERSION

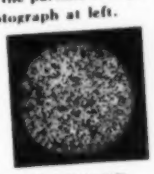
HOW POZZOLITH WORKS



UNDISPERSED

Pozzolith contains Master Builders' cement dispersing agent. Cement particles in their normal state in water tend to gather together in bunches; i.e., flocculate. This bunching entraps water within the particle clumps. See microphotograph at left.

With Master Builders' dispersing agent these bunches are broken up into individual cement particles distributed throughout the water; i.e., dispersed or deflocculated. See microphotograph at right.



DISPERSED

This dispersion makes the cement usable to its full efficiency; all the cement surface is made available for hydration and all the water for lubrication of the mix. (Water held within the particle clumps is released.)

FIVE ADVANTAGES

As a result of adding Pozzolith to cement mixes there occur these five advantages:—

1. Durability increased 50% or more.
2. High Early Strength — 20% or more increase in compressive strength at all ages.
3. Water reduction, up to 20% — slump increased 150% or more for given water ratio.
4. Increased water-tightness — 20% or more reduction in absorption and permeability.
5. Reduced bleeding and segregation.

ASSURED QUALITY CONCRETE WITH SPEED AND ECONOMY ON THIS GARY, INDIANA JOB

Permanent Construction Co., Chicago, Ill., Contractors on the Gary Sewage Treatment Plant state: —

"The addition of Pozzolith increased the workability and placeability of the concrete with no increase in the water cement ratio, greatly facilitating the placing and finishing operations."

The experience of the Permanent Construction Co. is not unusual.

Hundreds of contractors have benefited similarly since POZZOLITH was introduced ten years ago. Higher quality concrete at lowered costs has been achieved by contractors on many important jobs as a result of this outstanding technologic achievement.

SPEED WITH ECONOMY

Today POZZOLITH is recognized by important authorities as a vital aid in speeding up the national defense program. It is being included in numerous giant defense projects as well as in public and private construction.

In addition to speeding up the job, often at substantial savings, POZZOLITH produces five vital advantages as listed at left.

The complete story of Cement Dispersion and POZZOLITH will be sent on request. *Ask for the facts on how to make substantial savings with POZZOLITH.*

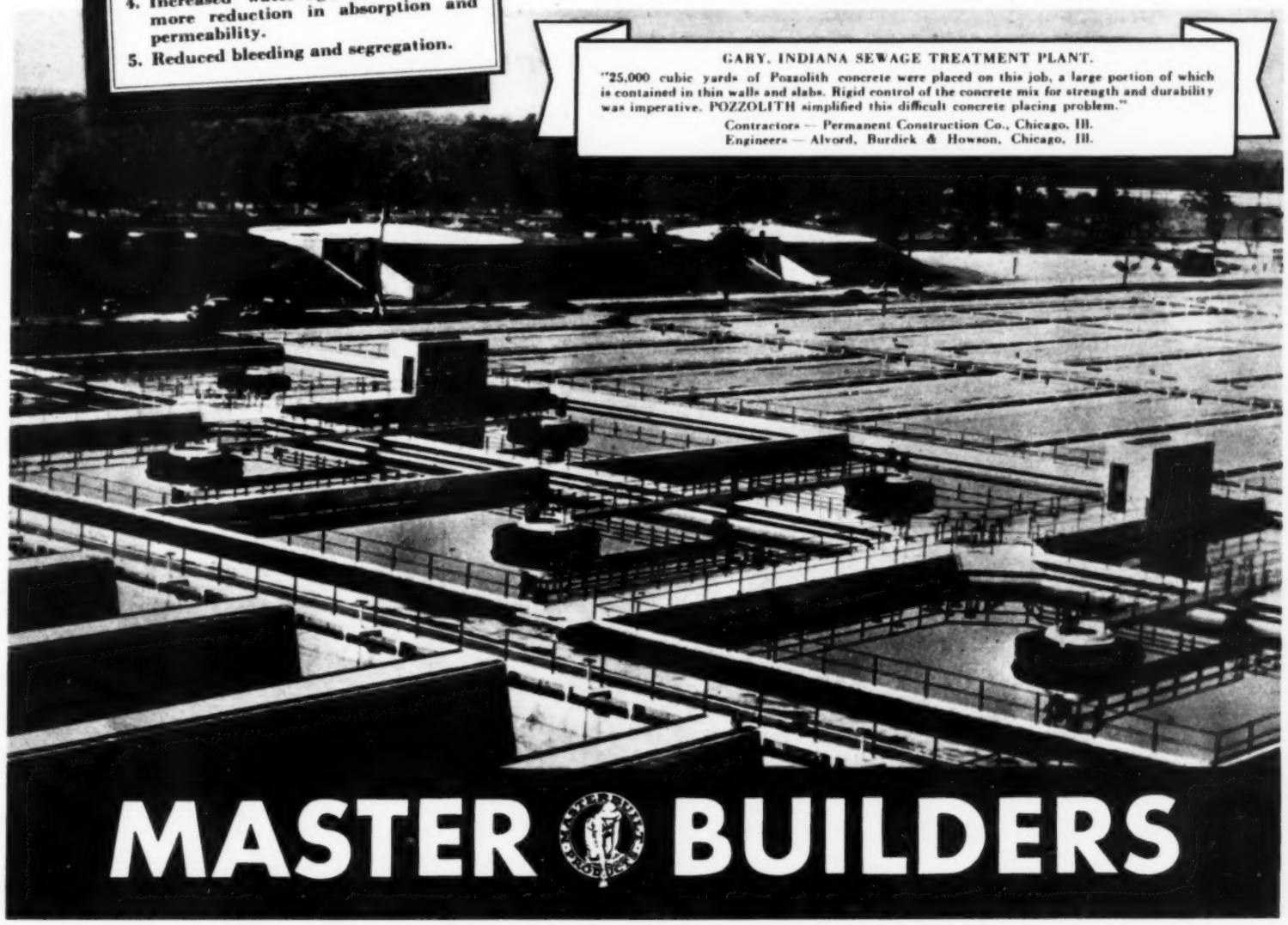
THE MASTER BUILDERS COMPANY

CLEVELAND, OHIO **TORONTO, CANADA**

GARY, INDIANA SEWAGE TREATMENT PLANT.

"25,000 cubic yards of Pozzolith concrete were placed on this job, a large portion of which is contained in thin walls and slabs. Rigid control of the concrete mix for strength and durability was imperative. POZZOLITH simplified this difficult concrete placing problem."

Contractors — Permanent Construction Co., Chicago, Ill.
Engineers — Alvord, Burdick & Howson, Chicago, Ill.



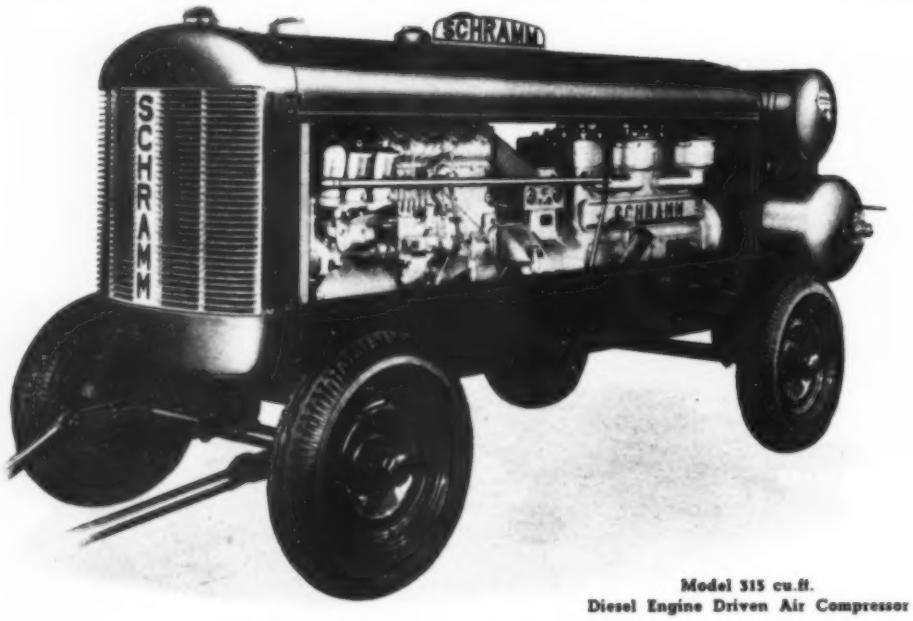
MASTER BUILDERS

RAZOR-BACK guarantees you MORE SHOVEL SERVICE per DOLLAR

because it's forged with a full-length backbone— to add life to the cutting edge, strengthen the frog and stiffen the 11" long socket. Sides, rolled to taper, keep it light weight

Made by **THE UNION FORK & HOE CO., COLUMBUS, OHIO**
SEND FOR PRICES AND NAME OF NEAREST DISTRIBUTOR

SCHRAMM BUILDS 'EM BETTER



Model 315 cu.ft.
Diesel Engine Driven Air Compressor

★ FOR EVERY AIR NEED ★

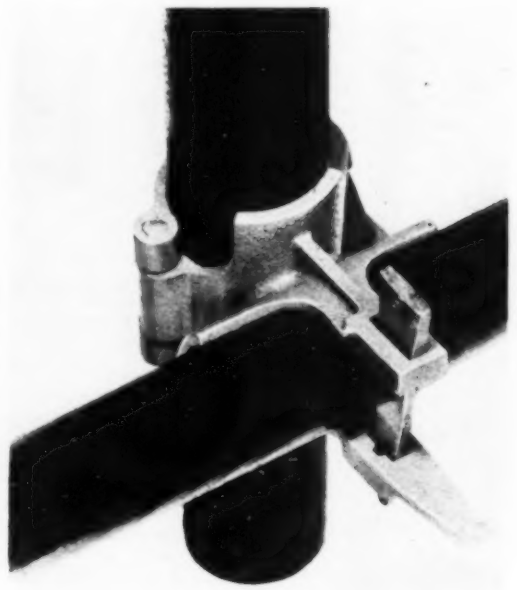
Sizes 20 to 420 cu. ft. — Portable or Stationary — Gasoline or Diesel Drive.
Write for illustrated Bulletin #42-P.

SCHRAMM, Inc.

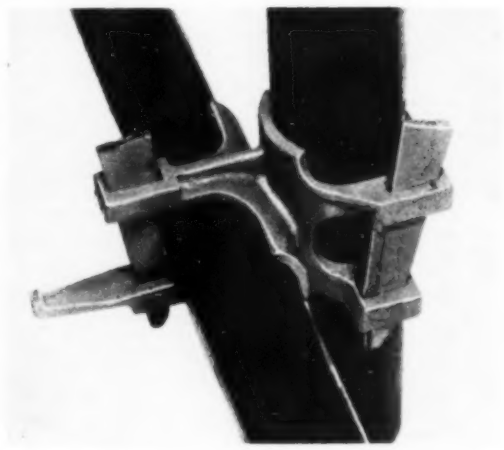
WEST CHESTER, PENNA.

COUPLINGS AND END CONNECTORS, known as "Quick Lock", make it possible to build tubular scaffolding or staging of any size or type on job without special tools or skilled labor and also to use any pipe at hand or pipe purchased from local jobber. No processing is required except threading of pipe for end connectors. For spacing

END CONNECTORS screw snugly on threaded pipe and lug engages recessed member, providing rigid union.



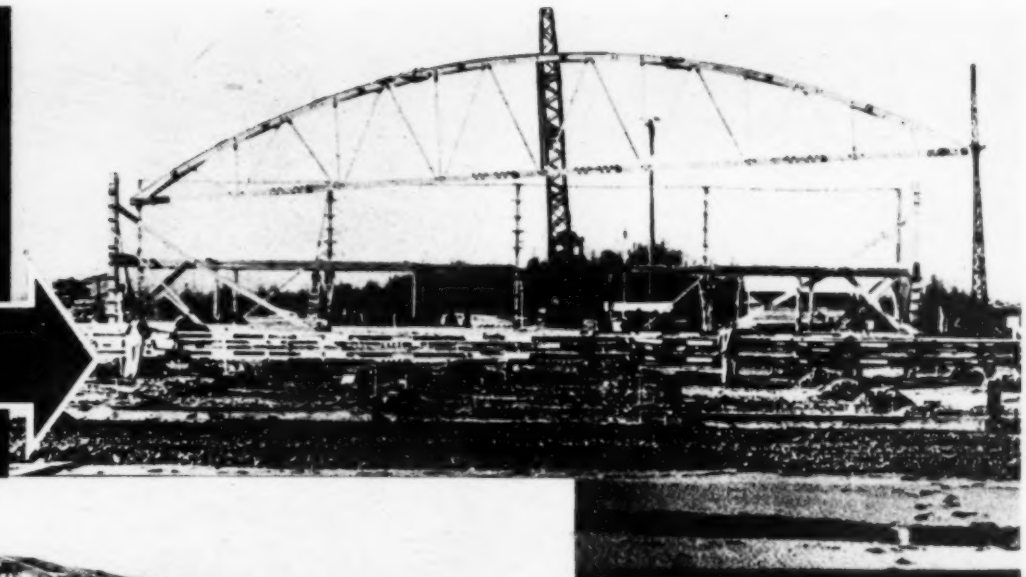
COUPLING with hinged jaws permits positioning at any point and holds scaffolding members at any desired angle



COUPLING IN PLACE with wedge locks engaged insures rigid angle joint. Wedges cannot become separated from clamp.

of vertical posts, horizontal girts or diagonal braces, hammer blows on wedge locks couplings with complete rigidity. Wedge is so designed that it cannot slip out of coupling whether engaged or disengaged. Trouble from stripped threads is eliminated as no nuts or bolts are used. End connectors are made to fit standard pipe and when once screwed on do not need to be removed. Construction of coupling said to provide maximum flexibility for holding scaffolding members at proper angles. Jaws are hinged so that couplings may be placed at any point. Couplings and end connectors said to be 100 per cent salvageable.—**Dravo Corp., National Department, 321 Penn Ave., Pittsburgh, Pa.**

Thursday
3:30 P. M.



Monday
4:30 P. M.

Timber DID IT
IN ONLY 32 HOURS!

Twelve 130-foot roof trusses of the Oregon Shipbuilding Corporation's great, two-story mold loft were swung into place by four 8-hour shifts of workmen. Only timber could set a speed record like that . . . only completely prefabricated timber delivered to the job ready for assembly.

The TECO Connector System of engineering produced this time-saving job; and TECO Connectors have created a wide, new range of structural uses for timber in modern building.

Have you a building problem involving immediate, emergency structural expansion? Forestall building supply bottlenecks—complete the job at a new "low" in cost . . . Mail the coupon now for detailed data on the TECO System of timber prefabrication. Send it today!

TIMBER ENGINEERING CO., Inc.
DEPT. M-9 1337 CONNECTICUT AVENUE
WASHINGTON, D. C.

Mail Coupon Today

Timber Engineering Company, Inc., Dept. M-9
1337 Connecticut Avenue, Washington, D. C.

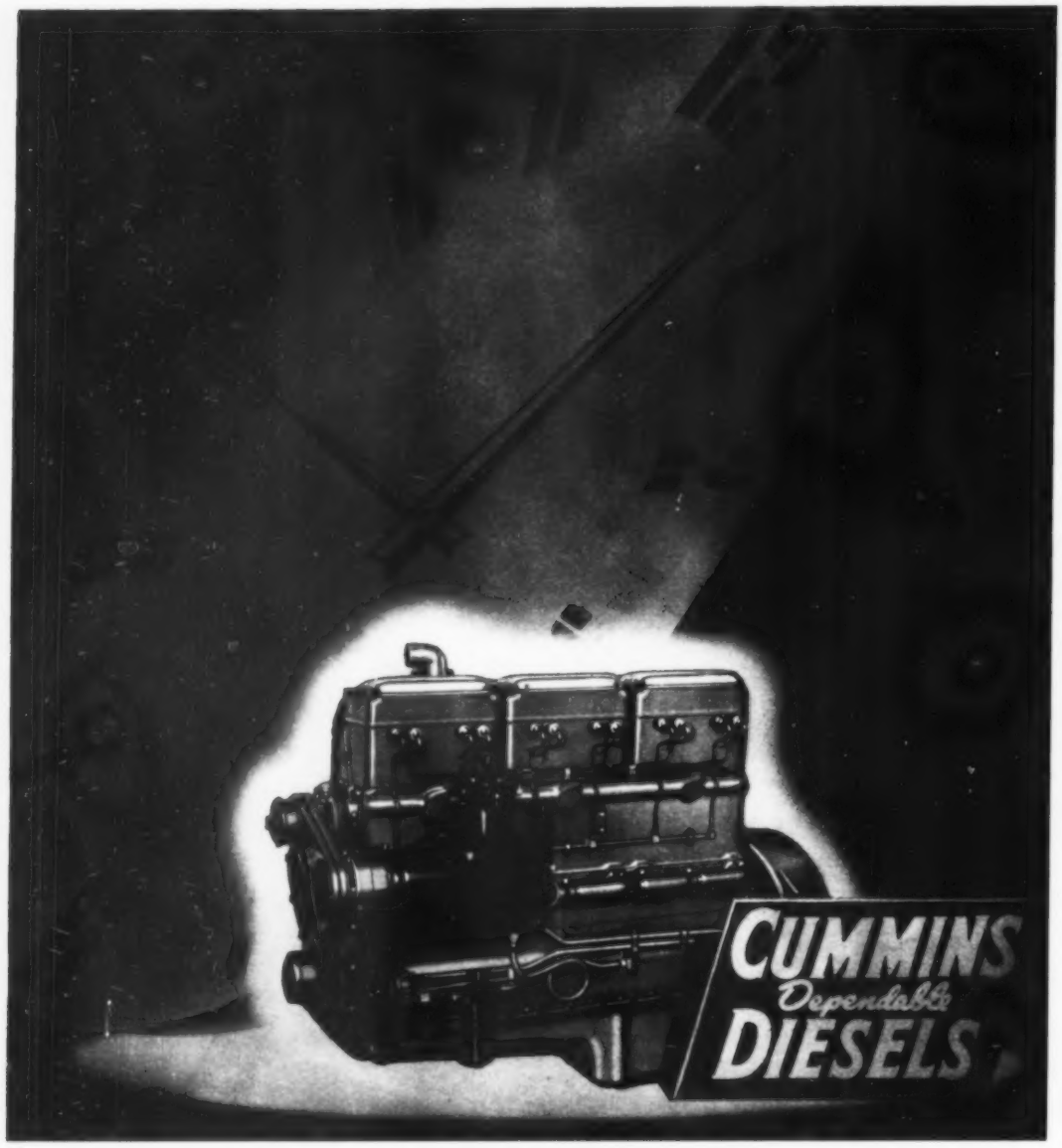
Please send us complete information on the TECO Connector System of timber construction.

Individual _____

Firm _____

Street _____

City _____ State _____

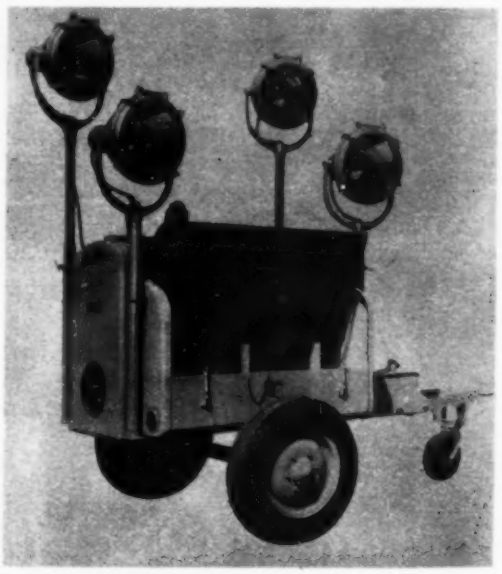


ILLUSTRATED: *Model HB1-600 Cummins Dependable Diesel, 150 hp. at 1800 rpm.*

24 HOURS A DAY

The job America has to do—the time allowed to do it—demands power of round-the-clock stamina and proved dependability. Not only are Cummins Dependable Diesels built to stand up under the most gruelling punishment with a minimum of maintenance and service, but they have established new performance records for all types of construction and material handling operations where they're constantly on the job, day and night. That's why the nation's leading contractors have standardized on Cummins Diesel power to keep vital defense projects moving 24 hours a day . . . moving on fast, emergency schedules that assure "doing the job in the time allowed." Cummins Engine Company, Columbus, Indiana.

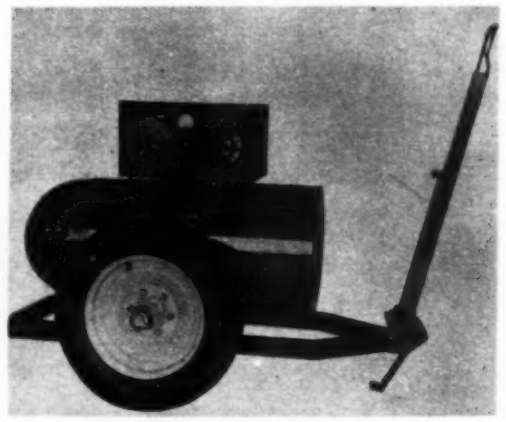
PORTABLE FLOODLIGHT, named "Nite-Hawk", to be towed by automobile or small truck, is said to fill need where power lines are unavailable or where connection and set-up would be too expensive. Recommended for night operations, such as all types of construction work, emergency airport lighting, quarries and gravel pits, night logging and in lumber yards. Unit carries four 1,000-watt wide angle floodlights, one in each corner. Each



light is individually operated from control panel and is adjustable up, down and in all directions. Lights may be raised to height of 8½ ft. and swung to 180-deg. vertical arc. In addition to providing light, unit has control panel with receptacles for operating small hand tools, such as electric drills, saws and hammers. Power is supplied by air-cooled, 14-hp. Le Roi engine equipped with electric starter. Self-regulating, 5,000-watt d.c. generator, connected to engine delivers direct current at 110 to 120 v. Housed in steel sheet inclosure with hinged side covers. Louvres at generator end and overhead ventilator permit air to escape when housing is closed. "Nite-Hawk" is mounted on heavy-duty, multiple leaf steel springs with two pneumatic-tired wheels. Retractable caster wheel is provided enabling one man easily to move unit about job. Height, with lights down, 7 ft.; width, 5 ft.; length 9 ft. 4 in.; weight, 1,775 lb.—**Lister-Blackstone, Inc., 1706 S. 68th St., Milwaukee, Wis.**

★ ★ ★

TWO-WHEELED WELDING MACHINE TRAILER is designed for mounting either Lincoln SAE 200- to 600-amp., a.c., motor-driven or SA 200 engine-driven arc welders. May be used for road towing up to approximately 30 m.p.h. and is said to be moved easily by hand because of low, underslung con-



struction, narrow 31-in. tread and method of balancing. Arc-welded steel construction throughout. Welders are mounted by four bolts in frame of trailer which register with holes in lugs on machine. Combination tow bar and standing support has hand-operated ratchet arrangement for locking support arm in position. Unit is 66 in. long, 42 in. wide, 16 in. high (over tires) and weighs 282 lbs. Tires are 5.50x16 in., 4 ply.—**The Lincoln Electric Co., 12818 Coit Rd., Cleveland, Ohio.**

Positive ROLLING EJECTION

★ CLEAN ★ EASY ★ FAST

In all kinds of dirt—loose or hard-packed, heavy or light, wet or dry—you can rely on Bucyrus-Erie Scrapers to eject their loads cleanly and get rid of them fast.

The dirt is **forced** out of these scrapers by pulling the ejector (a simple curved plate forming the bottom and back of the bowl) forward in an arc to a nearly vertical angle, so that dirt can't possibly stick. Material adhering to the sides is broken loose by wiper bars at each side of the ejector. There is no "dead" pull; the continuous rolling motion lowers resistance of dirt.

Because the dirt rolls out so easily, power demand is low, so low that the ejecting mechanism requires only a two-part line. This means saving time on the dump because dumping can usually be done in higher tractor gears.

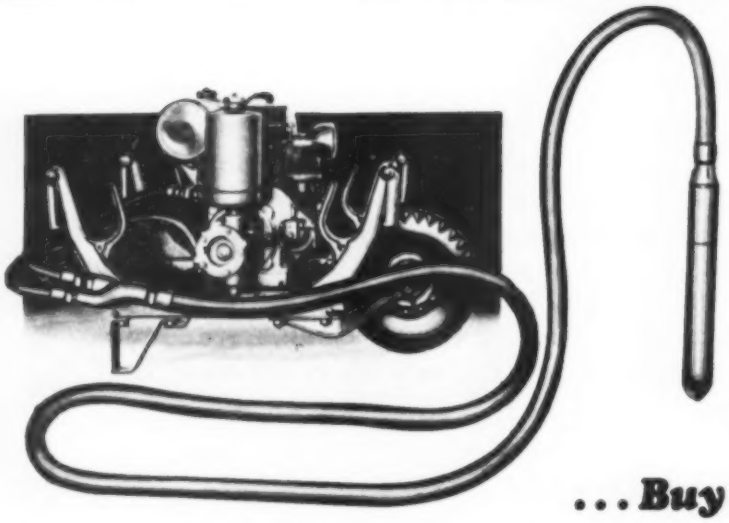
Ejection that's positive, clean, sure and fast; that you can rely on in all types of dirt; that works equally well on short dumps or long—that's what you need on these rush high-pressure jobs. That's what you get with a Bucyrus-Erie Scraper.
BUCYRUS-ERIE COMPANY, SOUTH MILWAUKEE, WISCONSIN, U. S. A.

SEE YOUR International TracTracTor DISTRIBUTOR

The ⅝ yard Hi-Power is a bucket the truck crane man swears by — for speed, digging power and yardage. Let us quote you prices on any size from ⅝ yard up.

In stock at New York, Philadelphia, Baltimore, Atlanta, Charlotte, Richmond, Hartford and Los Angeles
GEORGE HAISS MFG. CO., INC., 139th ST. & CANAL PLACE, NEW YORK—DISTRIBUTORS EVERYWHERE

Why fool around with "second-best"?
If you want to make speed profitably
GET DEPENDABLE EQUIPMENT



Automatic pressure lubrication —requires no attention.

34-ft. hose—2¾" vibrator head.

Adjustable frequency to 6800 R.P.M. — submerged in concrete.

Powerful gas engine—4.7 H.P.

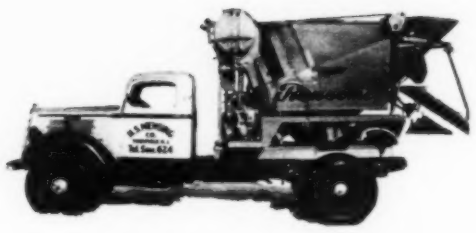
Long-lived, ball-bearing, rotary, hydraulic pump.

...Buy the Fast

JACKSON Hydraulic Concrete Vibrator

Designed to "take it" for 3 shifts a day — every day.
Used exclusively by many large defense contractors.

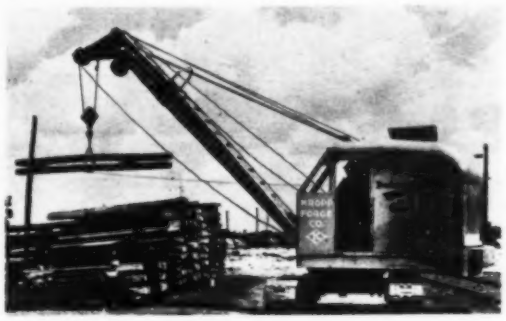
ELECTRIC TAMPER & EQUIPMENT CO.
DEPARTMENT E LUDINGTON, MICHIGAN



NEW TRUCK, serving builders supply field, is owned and operated by H. S. Mensing Co. of Somerville, N. J. and is fitted with Ransome 3-yd. hi-discharge type mixer. This mixer installed on this Mack Truck is said to afford several distinct advantages: It permits longer and steeper chutes to put concrete directly into high forms or buckets, and eliminates waiting at job and necessity for wheelbarrows. Also drier mixes may be chuted right into place without need for men to push concrete down chute.—**Mack Trucks, Inc., 34th St. & 48th Ave., Long Island City, N. Y.**

★ ★ ★

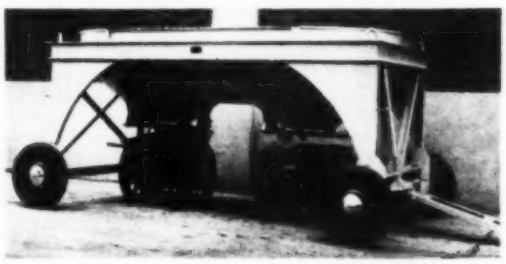
GOOSENECK BOOM YARD CRANE available in 5-, 6½- and 7-ton capacities, is said to provide greater stability under heavy loads and to facilitate car loading and unloading and working in close quarters. Gooseneck on end of boom claimed to assure satisfactory handling of long objects in confined space despite short boom and to speed unloading of flat cars and gondolas for stockpiling, piles 20 ft. or more high being stockpiled with ease. All operations in work cycle, such as swing, boom rais-



ing or lowering and load hoisting, are controlled by vacuum power, assuring fast operation and enabling operator to handle more work. Six handles which control various operations are mounted on tilted "desk-type" board. Vacuum control system said to eliminate trouble from freezing in winter and from condensation of moisture in summer. Other features: 175 f.p.m. minimum hoist speed; welded steel box-type boom; safety power drum brakes; minimum of 5.25 r.p.m. full swing; quick convertibility to shovel, dragline or lifting magnet; travels, swings and hoists simultaneously; 4 anti-friction-bearing hook rollers; 43 anti-friction bearings; power boom hoist and safety brake; flame hardened gears; "no chain" power hook-up through gears and double universal joint.—**Buckeye Traction Ditcher Co., Findlay, Ohio.**

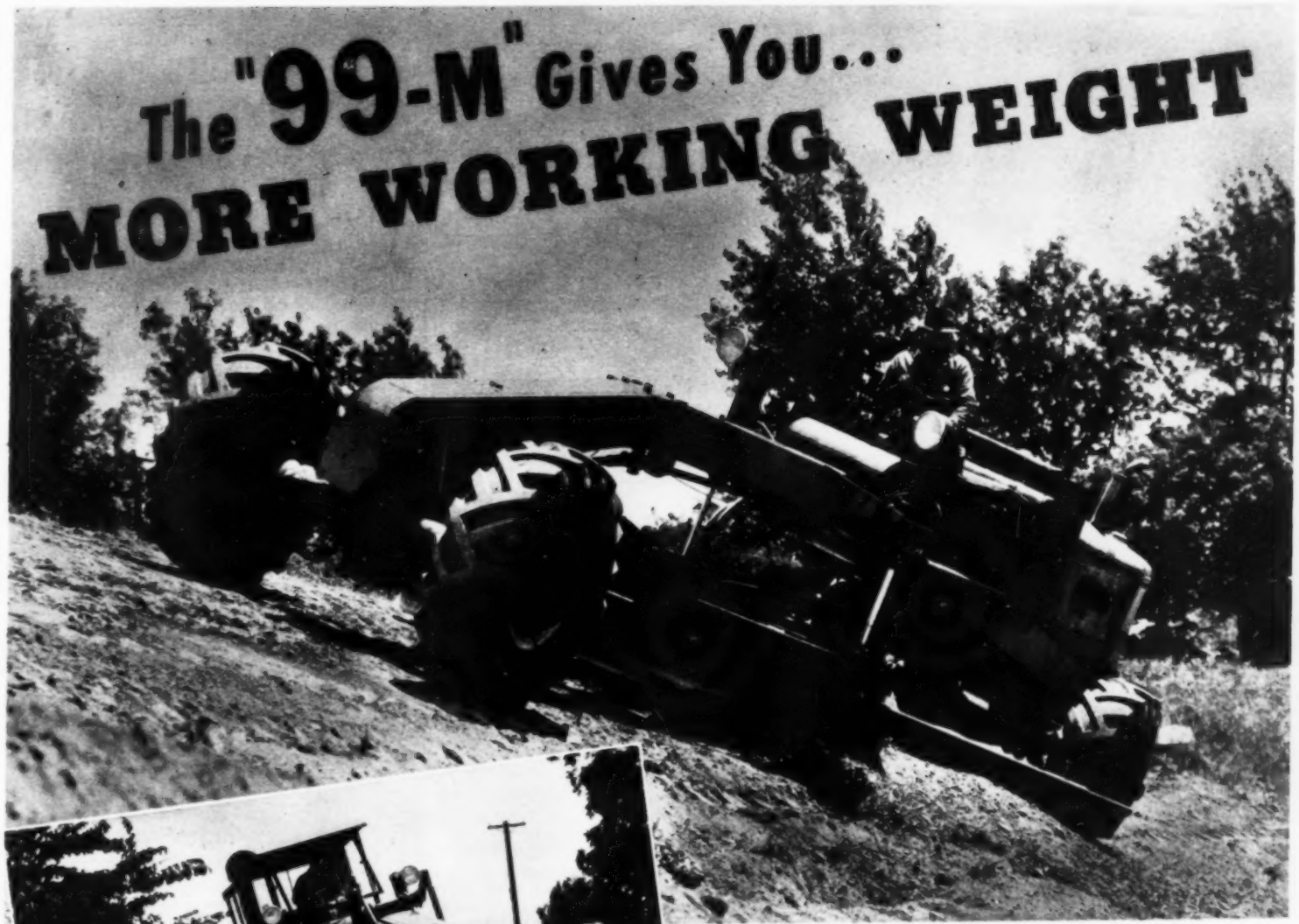
★ ★ ★

LOW HEAD ROOM HOPPER for high-dump truck mixers has four wheels which permit easy transportation from job to job without jacking or use of blocks. Low build enables hopper to receive mix from 4-cu.yd. high-dump truck mixer. Side



section may be removed to receive contents of 3-cu.yd. mixer. All-welded steel bin has interior similar to bathtub in order to insure self-cleaning. Double clamshell gates have floor clearance of 36 in. for loading concrete carts. Gates are 10x15 in. in size, unless otherwise specified. Overall dimensions, 8 ft. wide by 13 ft. long by 6 ft. 3 in. high. Weight, 3,000 lb.—**Garlinghouse Bros., 2416 E. 16th St., Los Angeles, Calif.**

The "99-M" Gives You... MORE WORKING WEIGHT



Figured in terms of live tractive weight, THE "99-M" IS THE HEAVIEST MOTOR GRADER ON THE MARKET

TO HANDLE MORE JOBS ... MORE PROFITABLY

● The "99-M" with its monorail frame enables you to breeze through jobs you wouldn't think of tackling with a conventional motor grader. This extra range of profitable usefulness is made possible by the "99-M's" extra *tractive weight* provided by its distinctive All-Wheel Drive.

With powerful traction on all four wheels, plus steerable rear wheels, the "99-M" enables you to keep going in bad weather and soil that formerly meant costly time losses. In addition to saving time and money on both normal and extra difficult motor grader jobs, it profitably handles the work of two, three or more "part time" pieces of equipment.

Wherever heavy snow is a Winter problem any available "99-M" is in demand. It's rear steer nullifies side thrust by the wing; while extra working weight provided by All-Wheel Drive makes the "99-M" far more effective in "bucking" heavy drifts.

Ask for a demonstration!

THE AUSTIN-WESTERN ROAD MACHINERY CO., Aurora, Illinois

A motor grader without power on the front wheels is like a draft horse with roller skates on his front feet.

Motor Graders • Loaders
Blade Graders
Elevating Graders
Hydraulic Scrapers
Crushing and Screening Plants

Cable Scrapers
Rollers • Roll-A-Planes
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to keep your road building or construction equipment in efficient operating condition . . . or to help speed up overhaul and repair work.

Safe to use . . . State, County and City highway departments, contractors and others will tell you Oakite materials and methods help you remove muck and grime from equipment EASIER, with less manual effort, MORE THOROUGHLY and ECONOMICALLY.

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Contains 20 pages of valuable data describing fast, low-cost methods for cleaning all types of road building equipment; removing scale and rust from Diesel water jackets, water-cooled compressors; steam cleaning tractors, trucks, etc.; effective methods for quickly removing tar, paint from equipment. Write for your copy today!

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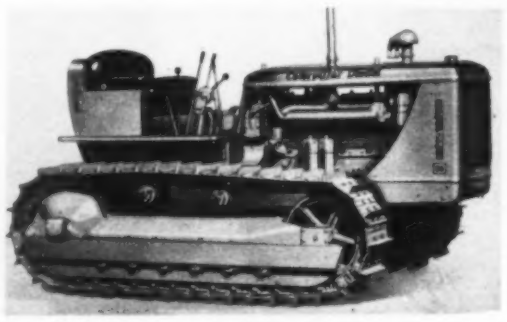
240 Thames St., New York

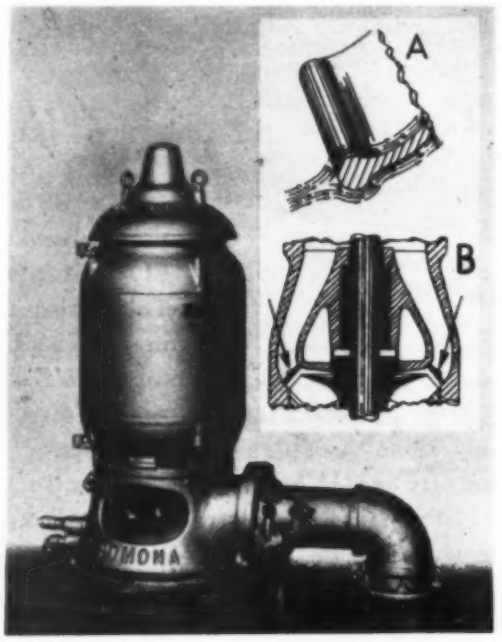
TRACK-TYPE TRACTOR, both gasoline and diesel models, 55-hp., has been placed on market to meet problem of greater capacity and speed without increased operating costs. Geared to job with nine practical working speeds—five forward offering range of from 1.4 to 5.8 m.p.h., with standard transmission group. For each of first four forward speeds there is a corresponding, but slightly higher reverse; and motion of tractor can be reversed merely by



pushing or pulling single lever. Optional transmission group, giving speeds spaced from 1.7 to 5.3 m.p.h., is available. All welded steel construction. Steering clutches individually removable through top of steering clutch case without disturbing final drive or large bevel gear that drives clutches. Powered by 6-cylinder, watercooled diesel engine with 4¼x5½-in. bore and stroke and rated speed, governed at full load, of 1,400 r.p.m. Comfort for driver provided for with wide, soft seat, back rest, liberal foot room and "teardrop" hood that allows satisfactory visibility. Variety of allied equipment available for use with tractor, such as cable-controlled or hydraulically operated 8-9 cu.yd. capacity scrapers, logging arches, bulldozers and winches. —**Caterpillar Tractor Co., Peoria, Ill.**

★ ★ ★

VERTICAL TURBINE PUMPS are now equipped with bulbous shaped guide vanes which assure greater uniformity of flow pattern, reduce friction and increase efficiency of fluid lift. This type of guide vane is considered superior to that formerly used because fluid being discharged by impeller element flowed across guide vanes at various angles (in-



VERTICAL PUMP, equipped with new type guide vanes. **(Insert A)** Bulbous shaped end of guide vane, showing even flow of fluid. **(Insert B)** Cross-section of bowl assembly. Arrows indicate location of guide vanes.

stead of directly across advance edge) causing eddy friction losses and reducing efficiency of pump. This improvement is inherent in pump design so that there are no gadgets or small parts to wear out. New vane shape is said to increase overall operating efficiency as much as 10 per cent and, in addition, permits high efficiency to be maintained over broad range of capacities. Moreover, broader guide vanes are claimed to give increased strength because of extra thickness. In order to take advantage of improved design, it is necessary only to substitute new bowl assembly in old pump.—**Pomona Pump Co., 206 E. Commercial St., Pomona, Calif.**

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This book systematically and comprehensively covers the entire subject of bridge and building foundation work as represented by the best American practice—with complete attention to the newest methods, the latest changes and the best engineering progress of recent years. Here are up-to-the-minute, cost-saving facts on all details of foundation work, covering:

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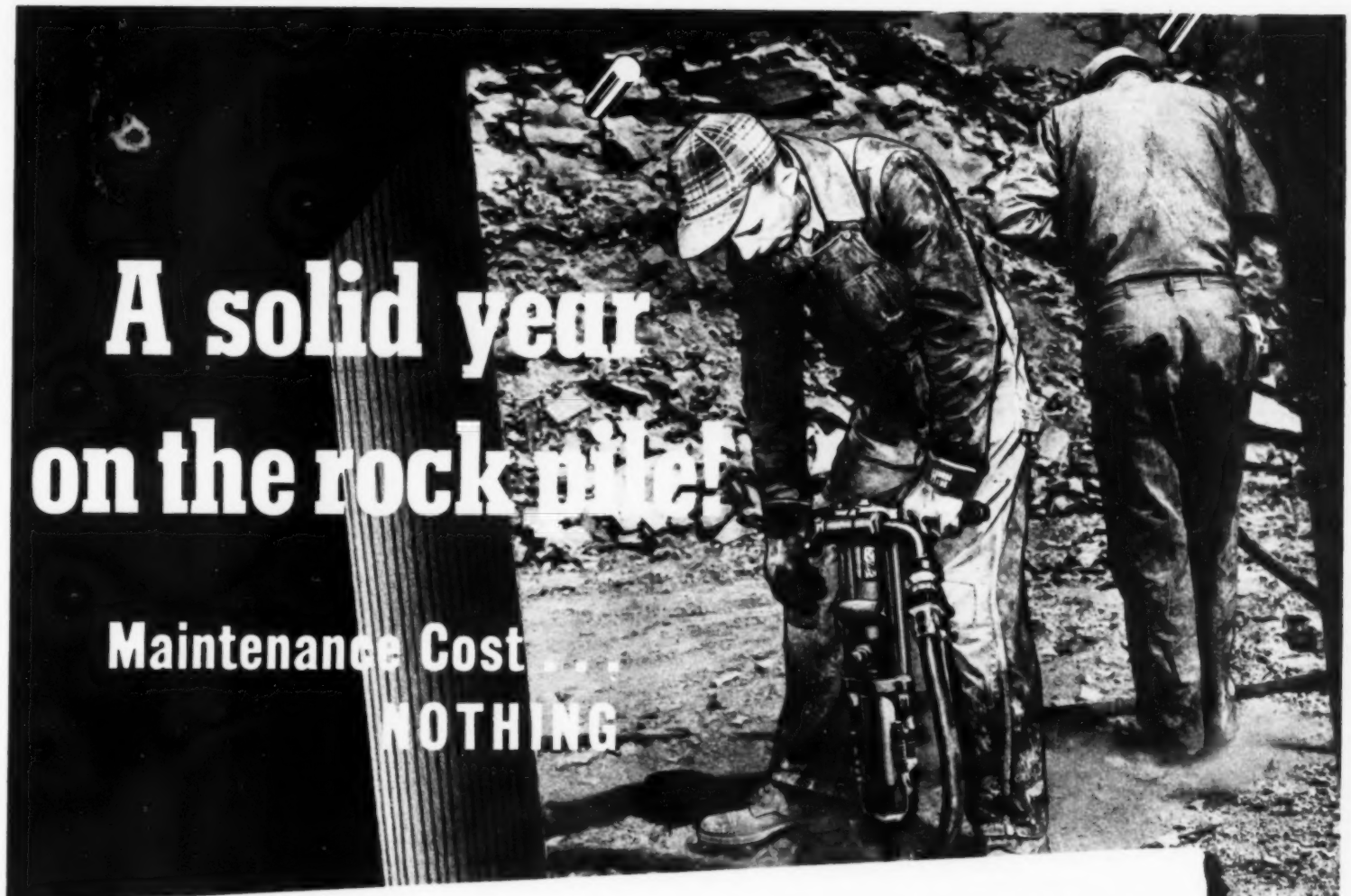

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This THOR No. 75 Sinker Rock Drill worked every day except Sunday for one solid year drilling 24-foot deep holes (2-5/8" dia. starters, 1-1/8" finishers) in hard, abrasive sandstone with quartz seams.

No repairs were required in the entire period.

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If it's action you want on your jobs—especially those scattered ones—"Mobilize" with Convertible Michigan Tandem-Drive Shovel-Cranes—Don't compromise speed and ability—get BOTH—and at reasonable cost. Write TODAY for Bulletin CM-19 and name of nearest dealer. MICHIGAN POWER SHOVEL COMPANY, BENTON HARBOR, MICH.

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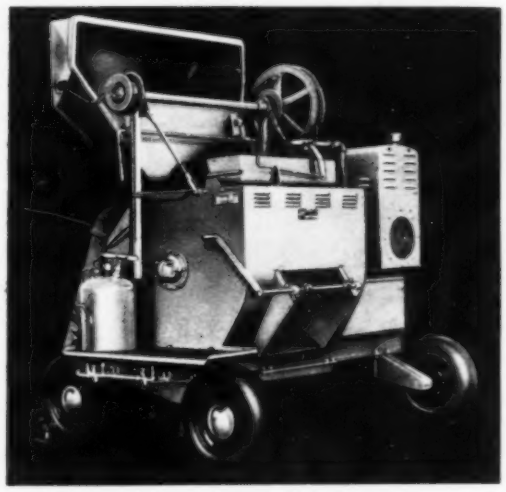
SHOVELS - CRANES - CLAMS DRAGLINES - TRENCH HOES

LARGER SIZE, NON-TITLTING BITUMINOUS MIXER 14-cu. ft. capacity, recently added to Kwik-Mix group, is designed for service in maintenance departments of states, counties and municipalities, as well as for paving of driveways, parking lots, tennis courts and filling stations approaches. Adaptable for mixing all standard types of cold-laid mixtures of cut-backs, asphalt, tar, emulsions and powdered asphalts where aggregates are mixed at atmospheric



temperature and heat required for bituminous material does not exceed 175 deg. Two large heaters said to eliminate considerable moisture from aggregate before bituminous material is added. Suitable either for central mixing plants or as portable unit to be towed from job to job on resurface widening and general maintenance work. Makers claim that 14-cu.ft. batch can be discharged in approximately 6 sec. Other features: (1) Light weight; (2) all-welded skip and drum; (3) anti-friction bearings, heat-treated reduction gears inclosed and running in oil and V-belt drive provide free flowing maximum power from excess horsepower engine to all operating functions with minimum friction loss; (4) skip, drum and 20-gal.-per-minute oil pump are provided with sufficient power for simultaneous operation.—**Kwik-Mix Concrete Mixer Co., Port Washington, Wis.**

★ ★ ★

ARM-TYPE HYDRAULIC HOIST for installation on 1½- to 2-ton truck chassis is said to be especially adaptable for use in connection with dump bodies from 8 to 10 ft. in length. These hoists, manufactured in three sizes, feature new lifting arrangement which reduces lifting effort considerably, as bodies are

lifted further forward than with conventional arm-type units. Lifting effort, which is disseminated over greater area, is confined within self-contained assembly of hoist unit. Other features: minimum stress on body and hinges and on truck chassis frame; long lever arm; fewer working parts; faster operation; minimum oil pressure; low mounting (when specified) and minimum weight for arm-type hoist. —**Gar-Wood Industries, Inc., Detroit, Mich.**

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...THAT'S WHEN YOU NEED *NEW* SHELL RUDIS

HERE'S A DIESEL OIL that can "take it." Proof? Shell Rudis Oil has already proved itself 3 ways. Tested in the laboratory, in test engines, under the toughest kind of field operating conditions, Shell Rudis came out with a record performance every time.

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Isn't that the kind of Diesel oil you're looking for? Investigate today!

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For Low Cost Street Paving

FASTER..BETTER

Blaw-Knox STEEL STREET FORMS will do your street paving work quicker and cheaper. The smooth steel imparts a smooth finish to the concrete, eliminating hand finishing.

Blaw-Knox Forms are built for long service; quick installation and dismantling; and are rigidly braced to hold their position when being filled with concrete.

Blaw-Knox Catalog No. 1527 shows how any design or cross section of work can be accommodated with Blaw-Knox Steel Street Forms. We'll gladly send you a copy.

Always ready for action to build . . .

- Combined Curb and Gutter
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- Integral Curb
- Any shape of Curb Face
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IN THE SPOTLIGHT

Exclusive Features of "Ames" Solid Shank Shovels

1 The blade and socket made from one solid piece of steel.
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5 D Handle shovel equipped with the famous ABW Armor-D Handle.

Add to these features the quality of the steel and the second growth Northern Ash handles and you have a shovel that is *tough!*

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PORTABLE AIR COMPRESSORS, called "Mobil-Air" units, are said to be first machines of this type with engines convertible from gasoline to oil or from oil to gasoline operation by substitution of fuel accessories and without changing heads or pistons. With this feature, user can convert his unit to take full advantage of lowest price fuel available in area

"MOBIL-AIR" COMPRESSOR for gasoline operation at left and another converted to oil operation at right. This is 315 c.f.m. size with spring mounting and automotive steering.

where he is operating. Unit is powered by Waukesha Multi-Fuel engine which runs on gasoline as new type high economy engine and employs same high turbulence combustion chamber used in type H oil engine. Another feature is Drill-More multi-speed regulator which automatically adjusts engine speed to use of air and is said practically to eliminate wasteful idling while air is being used. Weight of "Mobil-air" units 1/3 less than that of previous models. Other features: self-adjusting clutch, new spring mountings and automotive steering.—**Ingersoll-Rand Co., Phillipsburg, N. J.**

★ ★ ★

TREATMENT FOR DIESEL ENGINE COOLING SYSTEMS. New, non-injurious, strictly organic water treatment for circulatory cooling systems in diesel engines involves addition to cooling water of single liquid that is claimed to remove all scale and rust from cooling system and completely inhibit further formations. Formula, Bearite 22-A, consists of number of especially developed vegetable substances which are entirely harmless to paint, rubber gaskets, metal, etc., because they react only in presence of alkaline water, rust and scale deposits. Factual data sheet describing Bearite and its method of use is available.—**Water Treatment Co. of America, 1159 Hodgkiss St., Pittsburgh, Pa.**

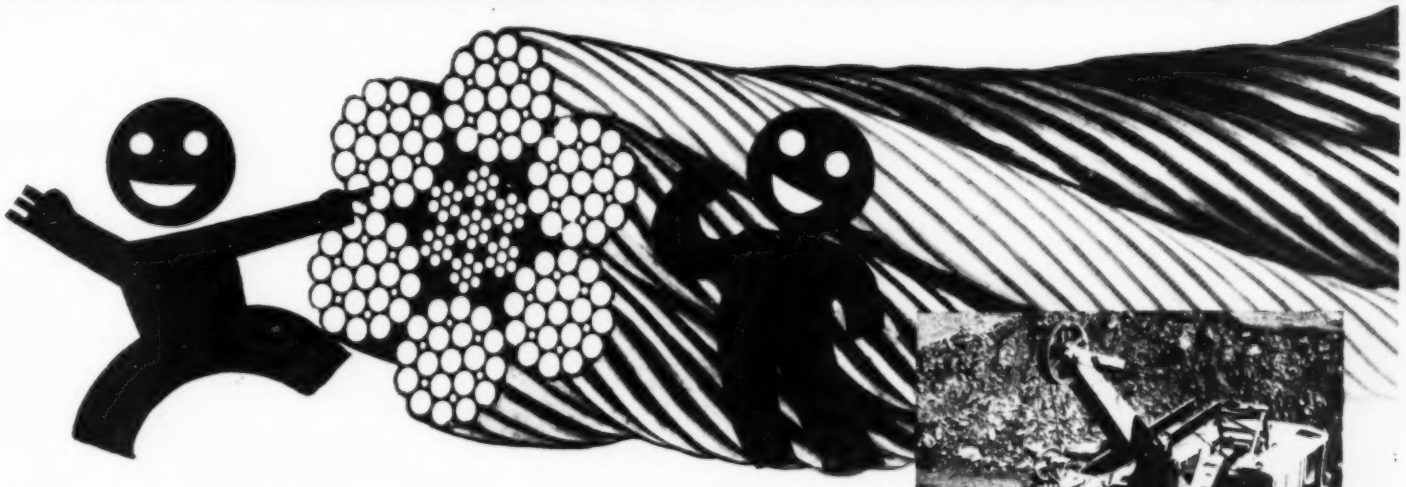
★ ★ ★

AIR-OPERATED IMPACT WRENCH for use in applying and removing nuts from 1/4- to 1 3/4-in. bolt sizes is designed with patented Pott impact wrench principle which localizes steel to steel impact without transmitting shock to other parts of tool. Reversing gears are not used. Small nose diameter and short overall length permits operation in close quarters.

Smooth, balanced power with negligible torque reaction makes possible safe and convenient one-hand operation. Said to be ideal tool for use in shipyards, steel construction and general repair shops. Average working speed at 90-lb. pressure 635 r.p.m Weight, 27 1/4 lb.—**Ingersoll-Rand Co., Phillipsburg, N. J.**

2 KINDS

OF WIRE MAKE MONARCH PREFORMED EXTRA FLEXIBLE AND EXTRA TOUGH!

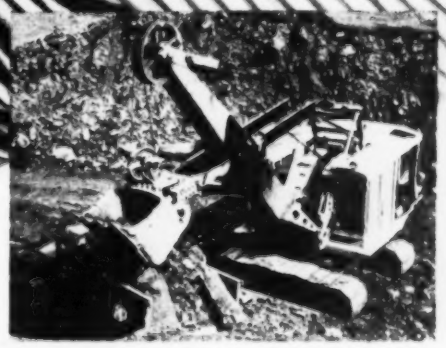


INNER WIRES ARE EXTREMELY FLEXIBLE. They're drawn in a special way to make them extra strong, extra pliable. They're improved plow steel too. They bend easily over your sheaves and drums. These wires are the reserve strength of Monarch Whyte Strand PREformed.

OUTER WIRES ARE EXTRA TOUGH. These wires are improved plow steel, specially drawn for outside service. They're made LARGER to provide more surface for better abrasion resistance. They are Monarch Whyte Strand PREformed's "first line of defense"... that's why we give them a TOUGH abrasion resisting skin.

And then to provide for EXTRA long life, every wire in a Monarch Whyte Strand is thoroughly covered with a special lubricant which protects unseen, inside surfaces against corrosion and friction. This better wire rope is available from stock in the correct size, grade and construction.

Your equipment may be similar to hundreds of others. Take advantage of the experiences of others having equipment like yours — ask for a Macwhyte recommendation of the rope that has proved itself to be the best for your equipment.



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MARMON-HERRINGTON *All-Wheel-Drive*

AMERICA MUSTERS HER SHOCK TROOPS FOR THE GREAT OFFENSIVE AGAINST

"General" Snow

"General" Snow is nothing to smile about in our northern tiers of states, where the blinding, clinging menace piles deep on highways and streets. To keep roads open and traffic moving requires heroic effort by snow-removal crews, sometimes for months at a stretch.

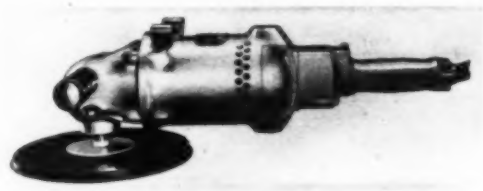
But given the right kind of equipment to work with, these men face the worst blizzards with courage and confidence. Even the deepest drifts are swept clear with plows mounted in front of sure-footed, fast moving Marmon-Herrington *All-Wheel-Drive* trucks.

For these economical, sturdy and dependable vehicles have the ability to maintain traction, without excessive loading, even on the slipperiest pavements. With all four or all six wheels actually taking hold and pulling, Marmon-Herringtons keep going when conventional drive vehicles would be stopped dead in their tracks.

We convert all standard Ford trucks to *All-Wheel-Drive*, and build a complete line of extra heavy duty *All-Wheel-Drive* vehicles in our Indianapolis plant. All standard types of rotary and V-plows are adaptable to these units. With snow-removal equipment dismounted the same vehicles are available for year around road construction and maintenance, where their superior traction enables them to do work no other wheeled vehicle can do. Literature describing all of these vehicles will be mailed on request. New issue Marmon-Herrington Pictorial News shows many snow-removal units in action. Send for your copy today. No cost or obligation.

MARMON-HERRINGTON CO., INC. • INDIANAPOLIS, INDIANA, U.S.A.

HEAVY-DUTY SANDER with 9-in. abrasive disks has been developed to meet demands for faster schedules. Features: (1) New, fast spindle lock for quicker change of pads and disks; thumb pressure, spring release, positive lock; (2) spiral-bevel gears for full, smooth power with less friction and noise, (3) Black



& Decker Universal motor operating on a.c or d.c.; (4) switch and commutator sealed against abrasive dust and grit; (5) plunger-operated switch, protected from accidental turning on; (6) ball-bearing equipped. Sanding pad, 10 in. diameter. Spindle, ⅝ in. diameter, 11-thread. No-load spindle speed, 5,000 r.p.m. Net weight, 18¾ lb. Shipping weight, 25 lb. Overall length without pad, 19½ in. This sander said to be ideal for use with wire cup brushes, saucer grinding wheels for right-angle grinding and planer heads for wood shaping and surfacing.—**The, Black & Decker Mfg. Co., Towson, Md.**

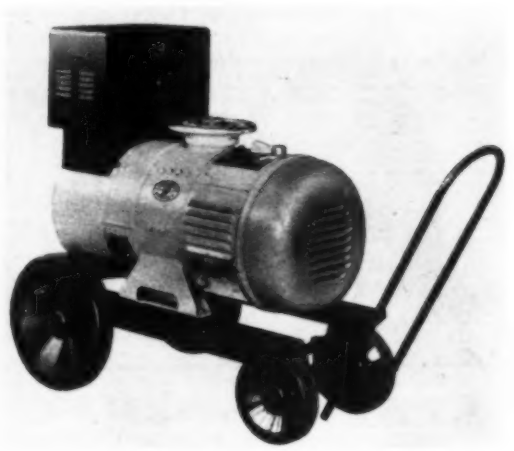
★ ★ ★

SAFETY GOGGLES fitted with Super Armorplate lenses which can be ground to prescription are now available for those workers who have defective vision. These goggles include spectacle and side-

shield types for different kinds of eye hazard and lenses. May be procured either in clear white or in Calobar and Crookes glare protection glass. These glasses, properly ground, provide maximum safety and working efficiency for those who use them.—**American Optical Co., Southbridge, Mass.**

★ ★ ★

CRATER ELIMINATOR for arc welding is auxiliary device mounted on body of arc-welding generator, connected in series with excitation field of generator and controlled by switch which enables operator to cut it in and out of excitation field at will. When



A Five Star Final on PIPE ECONOMY

Here's good news on drainage and sewerage jobs. You can stay ahead of schedule and under the estimate by using Armco Corrugated Paved Invert Pipe. Check these five profitable advantages:

1

INSTALLED IN A JIFFY

Unskilled men can install Armco Pipe in short order. Long lengths (20 to 30 feet) are handled safely with ropes and plank skids. Band couplers make strong, tight joints. And there's little danger of damaging Armco Pipe. Cracked sections can't delay the job.

2

HOLDS GRADE AND ALIGNMENT

Shifting soils and unstable foundations are no problem when you use Armco Paved Invert Pipe. Band couplers and flexible corrugated metal design see to that. Just ordinary care in preparing the trench assures proper grade and alignment. Cradling is seldom needed.

3

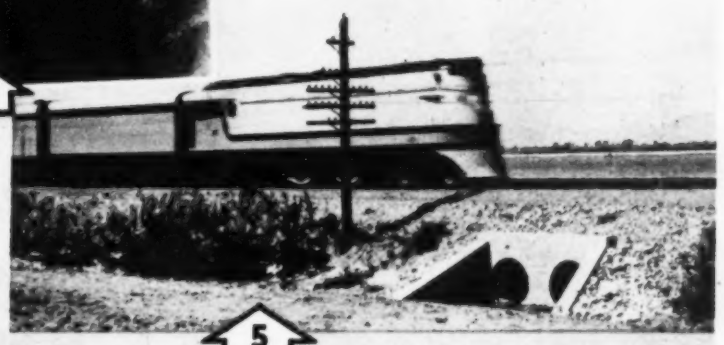
4

LAUGHS AT BAD WEATHER

Ice and frost or other bad weather holds no terror for Armco Paved Invert Pipe. You can install it in any season without special protection or troublesome curing.

ANY FITTING YOU NEED

Armco tailor-made fittings go in slick-as-a-whistle. You're bound to save time and money with standard tees, wyes, elbows, or other "specials" custom-built to fit the job.



5

STRENGTH TO SPARE

Armco Pipe takes the weight of high fills and traffic impact in stride. The flexible design provides strength to meet loading specifications with a wide margin of safety.

ENGINEERS SAY OKEH: Armco Paved Invert Pipe also brings this double assurance of low-cost, trouble-free service: (1) A base metal of galvanized Armco Ingot Iron — proved in 35 years of service; (2) The added protection of a thick, bituminous pavement in the bottom to guard against corrosion and erosion where the wear is hardest. Engineers appreciate this extra durability and accept Armco Pipe without question. Write us today for prices. Armco Drainage Products Assn., 502 Curtis St., Middletown, O.

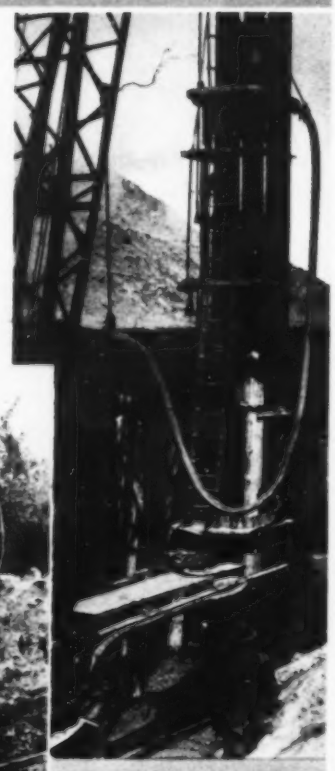
ARMCO Paved Invert Pipe

You Can Bank on All 3...

FOR LONG RELIABLE SERVICE!

GOODALL "INFERNO" STEAM HOSE

Mandrel cured, high-tensile asbestos cord construction that is *burstproof*. Rubber tube repels hardening effects of high temperature steam. Weather-resisting cover. For working pressures up to 200 lbs., and temperatures to 400° F. Sizes ½" to 2½" maximum lengths of 50 feet.



GOODALL "SUBWAY" AIR HOSE

Wrapped duck construction, "Balanced-Built" to insure equal life and service for tube, carcass and cover. For paving breakers, rock drills, riveting hammers, etc. Sizes: ½" to 1¼", inclusive; maximum lengths of 50 feet.

GOODALL "ROADBUILDERS" WATER HOSE

Plies of exceptionally strong, hard-woven duck, over a tube of smooth, tough rubber, and surrounded by a red rubber cover that offers outstanding resistance to abusive surface wear . . . a construction that has earned for this hose unequalled acceptance among contractors everywhere. Sizes 1" to 2", inclusive; maximum lengths of 50 ft.

Mail the Coupon for Prices on Above, and New Circular Showing How Water Hose is Commonly Abused, and What Happens When it Fails

GOODALL RUBBER COMPANY, INC.
PHILADELPHIA, PA.
MILLS, TRENTON, N. J. EST. 1873
Branches and Distributors from Coast to Coast

GOODALL RUBBER CO., INC.
36th and Market Sts., Philadelphia, Pa.
Gentlemen: Quote prices on
☐ "INFERNO" ☐ "SUBWAY" ☐ "ROADBUILDERS"
☐ Send new circular on "Roadbuilders Water Hose"
Name.....
Company.....
Address.....
P.O. and State.....

introduced into circuit it functions as variable resistance of large enough capacity to build up resistance in excitation field and thus lower excitation field making it possible to reduce current density gradually without disturbing current setting of welding generator. In this way current may be tapered off instead of being abruptly changed. Weld deposit under these conditions is free from porosity at end and has smooth, even contour instead of typical depression. Control of "Stroco" eliminator is by three position button switch located on electrode holder. Is said to be particularly useful in welding of thin walled tubing used for aircraft structures and also in arc welding on material of heavier section where characteristics of typical arc crater are objectionable, for example, in welds of high pressure tanks and piping, some types of storage tanks, hard facing of cutting tools and high alloy deposits. In these cases, crater is completely chipped out before deposit is continued resulting in additional cost which can be avoided by use of eliminator.—**Wilson Welder & Metals Co., 60 E. 42nd St., New York City.**

★ ★ ★

EASY SHIFT for Timken two-speed axles has what is said to be a revolutionary design of spline teeth which allows instantaneous engagement of shift collar with desired spur pinion at synchronized speeds. Change of gear ratios is accomplished by shifting collar on cross shaft from engagement with one spur pinion of second gear reduction into engagement with other spur pinion. With new design

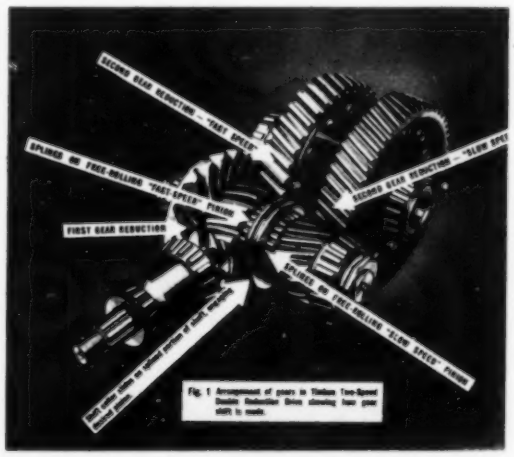

SECOND GEAR REDUCTION—"LOW SPEED"
SPLINED OR FREE-ROLLING "HIGH SPEED" PINION
FIRST GEAR REDUCTION
SECOND GEAR REDUCTION—"LOW SPEED"
SPLINED OR FREE-ROLLING "LOW SPEED" PINION

Fig. 1 Arrangement of gears in Timken Two-Speed Double Reduction Drive showing how gear shift is made.

of spline teeth, gear shifts can be made without declutching in most instances with a little practice. Not only is shifting said to be easy for manual control, but it is now possible for first time to utilize remote control power shifting—vacuum, compressed air or mechanical. "Easy Shift" has been hooked up with power shifting in several ways by vehicle builders. Where vacuum power is used, vacuum cylinder shifts in one direction by use of vacuum and in return direction by means of spring. Power unit mounted directly on differential carrier. Control button, or cable knob, operates vacuum valve. Power actuation of "Easy Shift" provides silent and effortless shift with lightning speed from one gear ratio to other. This results in elimination of speed loss in shifting on upgrades, elimination of shock loads from sudden clutch engagement and also dispenses with extra control lever in cab. — **The Timken-Detroit Axle Co., 100-400 Clark Ave., Detroit.**

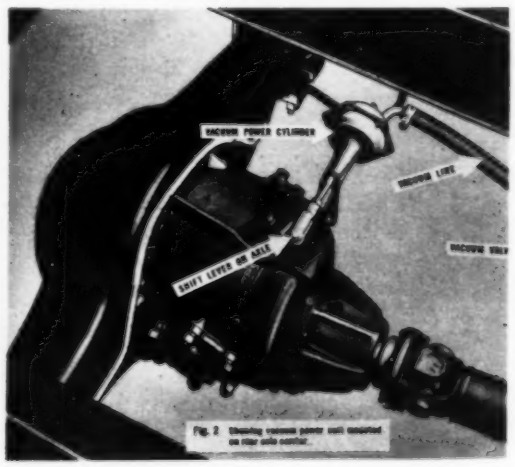


Fig. 2 Showing vacuum power unit mounted on rear axle center.

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★ DISTINGUISHED SERVICE ★

for 34 Years

Since 1908 Baker Equipment has enjoyed a carefully guarded reputation for quality and dependable performance.

That's why Baker Hydraulic Bulldozers, Gradebuilders, Hydraulic Scrapers, Maintainers, Road Discs and Rooters are in such demand for important defense construction — with Baker Snow Plows standing by to keep access roads open throughout the winter.

Defense orders must come first. Your requirements, for whatever purpose, will be taken care of to the very best of our ability. We suggest that you order only what you require now and that you keep your present Baker Equipment at the peak of efficiency. Our service department is ready to help in every way possible.

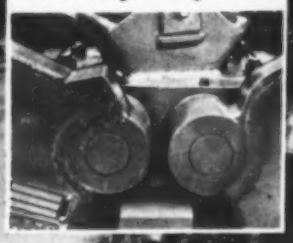
Ask for Bulletins on any Baker Product

THE BAKER MANUFACTURING CO.
568 Stanford Ave., Springfield, Illinois

EQUIPMENT
FOR EARTH MOVING
ROAD MAINTENANCE
AND SNOW REMOVAL

"WE FIND THE DOUBLE HINGE A DECIDED ADVANTAGE IN HARD DIGGING AND WET EXCAVATION."

Easier operation and greater spread with Williams double hinge arrangement.



Eugene F. Verga, Inc., New Jersey Contractors, writes:

"Your new type welded rolled steel constructed Multiple Rope Bucket is *most satisfactory in every respect*. In sewer excavation, the double hinge is a decided advantage due to longer spread of spades."

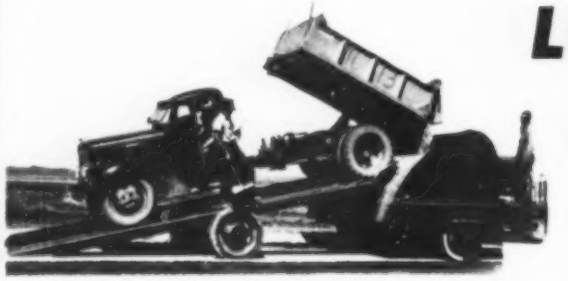
The stronger, weight saving, welded construction and the many mechanical features developed in designing and building buckets since 1906, make Williams Buckets without a superior for hard service.

Distributors in all parts of the country, ready to give fast service. Descriptive bulletin FREE on request.

Note how Williams sheave design keeps cable leads straight, avoiding side friction and wear.

THE WELLMAN ENGINEERING CO.
7017 Central Ave., Cleveland, O.

WILLIAMS *Buckets*
***built by* WELLMAN**



LOAD THE HOPPER

—and the "Chip-Top"
SPREADEROLLER
will, in a single fast operation,

- Segregate the chips.
- Spread a seal coat in three layers—coarse, common and fines on top.
- Roll them smooth and firm in an anti-skid, high visibility, water-repellent surface.
- Treat 10′ width of roadway at a time eliminating detours. No breaking of shoulders. No center ridges at overlap. Rollers always run on finished road—no gumming up.
- Turn out up to a mile an hour of finished roadway.

It's three machines in one—a cost-cutter on county highways, residential street maintenance and airport runways. Get the facts!

UNIVERSAL CRUSHER CO., 327 Eighth St. W., Cedar Rapids, Iowa

UNIVERSAL
CRUSHERS, PULVERIZERS, COMPLETE PLANTS, SPREADEROLLERS, PORTABLE ASPHALT PLANTS

PORTABLE ACETYLENE GENERATOR for use in oxyacetylene welding and cutting, known as Oxweld MP-10, will deliver 30 cu.ft. of acetylene per hour, is suitable for welding metal up to ⅜ in. thick and for cutting steel up to 5 in. thick. Generation of acetylene is started, set for regular operation and stoppped by rotating single pair of operating handles at top of generator. Pressure of acetylene delivered to blowpipe is controlled by regulator, and separate pressure gage indicates pressure within generating chamber. Other construction features: two relief valves which are said to vent automatically any excessive pressures developing within generator or delivery hose, and hydraulic back-pressure valve which, by providing water seal between hose and generator, prevents reverse flow of gas. Carbide hopper, 15-lb. capacity, is said to be easily recharged by removing valve insert and inserting carbide funnel. Revolving agitator blade at bottom of generator facilitates removal during recharging of residue from generating chamber. Weight, 100 lb. empty; 250 lb. when charged. Height, 3 ft. 2½ in.—**The Linde Air Products Co., 30 E. 42nd St., New York City.**

★ ★ ★

IMPROVED MATERIAL HANDLING CRANE, named Mobilcrane mounted on pneumatic tires and operated by one man and one motor, offers several new features: air control of all movements, independent boom hoist, travel and swing motions and hook rollers. Truck frame has three point suspension which eliminates twist and strain when

traveling over rough surfaces. For lifting, front axle, is equipped with leveling jacks which keep upper body on even keel. Gear-driven transmission provides four speeds ranging from ¾ to 5 m.p.h. Heavy roller chain transmits power from differential to tandem rear wheels, all driven, which are mounted as unit and oscillate when traveling over rough, uneven ground. Final driving chains inclosed in oil tight chain case. Air control of all motions (except hoisting brake) accomplished by twin-disk clutches on swing, travel and hoisting mechanisms. Independent boom hoist is operated by two twin-disk clutches. Independent travel is operated by twin-disk clutch, with change of direction made through bevel gears. Two speeds are obtained through spur gears and selective clutches, enabling machine to make lift, swing and/or travel with load in any direction. Although for use primarily as crane, model also is available as air-controlled shovel, dragline, or clamshell with conventional crawler mounting. — **The Osgood Co., Marion, Ohio.**

"THE RIGHT PRODUCT WHERE WE WANT IT..."

WHEN WE WANT IT"... SAYS CONTRACTOR

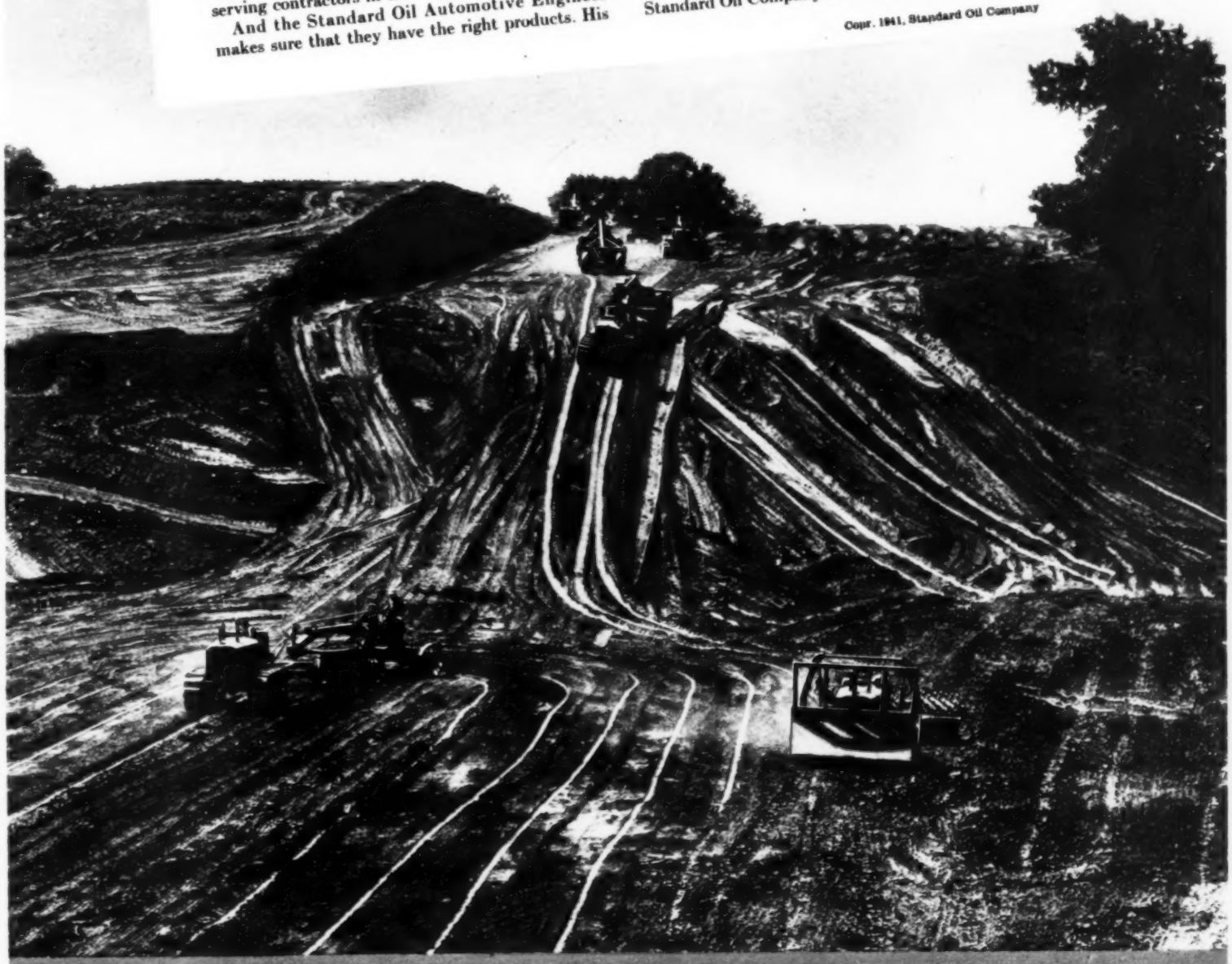
► THAT'S A BIG ORDER when it means delivering the gasoline, motor oil, and Diesel fuels and lubricants that Joseph Kesl and Sons Co. uses. This earth-moving contractor operates over one hundred track-type tractors. They'll cover a lot of territory when working on a grading job such as the one shown here on Route 14 in St. Clair County, Illinois. But the products they need are there when they need them with no delays or work interruptions—thanks to Standard Oil's unmatched facilities for serving contractors in the Middle West.

And the Standard Oil Automotive Engineer makes sure that they have the right products. His recommendation of Standard's new Viscous Track Roller Lubricant has cut grease costs in half. Diesel engine maintenance has been reduced 15% with RPM DELO.

Put these two services to work for you—Standard Oil Automotive Engineering to be sure you get the products you should have, and Standard Oil Distribution to be sure you get them when and where you want them.

You can reach one of these Engineers through the nearest Standard Oil (Indiana) office, or by writing 910 South Michigan Avenue, Chicago, Illinois, or Standard Oil Company of Nebraska at Omaha.

Copr. 1941, Standard Oil Company



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More For Your Money!

PRACTICAL DESIGN . . .

Behind the Clyde name are many years of engineering and manufacturing experience . . . years devoted to meeting the demands of the contractor and builder. Years of constant effort to improve design, increase strength and prolong life of Clyde equipment. This experience is your assurance of getting full hoisting value when you buy a Clyde.

PROVED PERFORMANCE . . .

Thousands of Clyde machines, many of the first ones manufactured, are in use throughout the world. Their low operating and maintenance costs combined with their ability to give day-after-day trouble free performance, save time and money for their owners.

CLYDE IRON WORKS, INC.

DULUTH - MINN.

GASOLINE, ELECTRIC & STEAM HOISTS, STEEL DERRICKS, CARPULLERS, WHIRLEYS

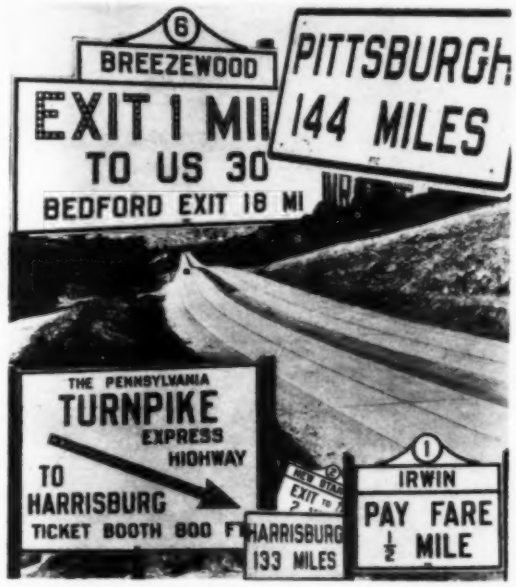
Porcelain Enameled Signs

On Pennsylvania Turnpike

PORCELAIN ENAMELED SIGNS have been found most satisfactory as road markers on the Pennsylvania Turnpike, because of their legibility, durability, economy, sightliness and low maintenance cost. Installed over the entire route, these signs distinctly mark the towns, cloverleafs, speed reduction zones, caution and restricted zones, entries and exits from the highways, and tunnels.

Manufactured by Porcelain Metal Products Co., of Carnegie, Pa., the base metal of these signs is Jones & Laughlin vitreous enameling sheets upon which has been fused at high temperatures a smooth porcelain enamel that is claimed not to flake, peel, or blister under severe conditions. Permanently resistant to all weather conditions, they are said not to fade or streak, and because of their non-porous finish, to repel attacks of injurious acids.

Porcelain enameled signs used on the Pennsylvania Turnpike, some measuring as large as 8x12 ft., are buttoned with cat-eye reflectors outlining words for night



VISIBLE FROM ALL APPROACHING ANGLES both day and night, these porcelain-enameled signs mark Pennsylvania Turnpike throughout its 160-mi. length.

driving. The curve and warning signs are black on a yellow background, while the directional and marking signs are black on a white background.

Porcelain enamel, an opaque glass composed of minerals having no organic ingredients, offers a complete range of permanent colors of any value or intensity in a variety of finishes, termed: glossy, glaze, lustrous, and matte.

Laying the groundwork for our Air Defense WITH HEIL ROAD MACHINERY

Heil Earth-Moving Equipment Gives You Faster — Cleaner — Profitable Operation

Heil Cable-Operated Scrapers are laying the groundwork on defense projects all over the country — and more and more successful defense contractors are switching to Heil Scrapers to get the increased yardage production and lower operating costs they offer.

Faster loading and unloading, bigger top loads, lower cable replacement costs, and fewer service requirements are the EXTRA FEATURES you get in HEIL TWIN-CABLE SCRAPERS. Built in 6, 8, 10, 12, 16, and 24 yard sizes, Heil Scrapers are available in the proper capacity for operation with any make or model of tractor. See your nearest Heil distributor or write, wire, or phone us today for detailed information.

16-Yard Heil Scraper at Montgomery, Ala. Airport. Model FD Cletrac with Heil Bulldozer is used for Push-Loading.

Left: This powerful Heil Hydraulic Bulldozer took the place of three other tractor units at Columbus, Ohio, Garbage Disposal Plant.

Right: 9-Yard Heavy-Duty Heil Rock Body for stripping ore from open pit mines near Duluth, Minn.

THE HEIL CO.

MILWAUKEE, WISCONSIN • HILLSIDE, NEW JERSEY

NO CRIMPING "FINGER PINCH" THAT SPOILS WIRE ROPE

When a Laughlin drop forged Safety Clip takes hold of wire rope, it means business. The solid fist-like grip is 50% more efficient than ordinary U-Bolt Clips, as proved by recent tests at a famous engineering school.

You also save the rope that would ordinarily be cut off after being crimped by the "finger pinch" action of U-Bolt Clips. Laughlin Safety Clips, when removed, leave the rope straight, uncrimped, ready to use again.

FEWER CLIPS NEEDED. Where you've been using four ordinary U-Bolt Clips, you will need only three Laughlin Safety Clips to get the same strength.

FASTER TO APPLY. Laughlin Safety Clips have nuts on opposite sides — easy to get at — you can use two wrenches at once. That saves time — and many a cuss-word.

Write for the free booklet giving results of tests made by a famous engineering school. Take the first step to saving some real money by mailing the coupon now.

THE THOMAS LAUGHLIN CO.
Portland, Maine

Please send me free Safety Clip booklet G-9

Name.....

Company.....

Address.....

Check here for catalog on items below ☐

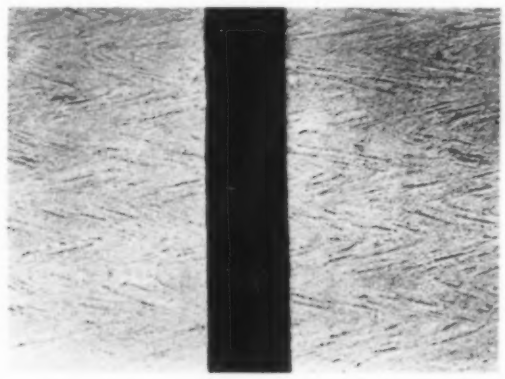
Look for Laughlin products in Thomas' Register and buy through your distributor.

Permanent Center-Line Stripes

MARK 600 MILES OF TEXAS HIGHWAYS

CENTER LINE STRIPES that are said to be both economical and permanent have been giving satisfactory service on 600 mi. of concrete pavement placed by the Texas Highway Department during the last few years. Several hundred miles of this line have been in use for as long as three years and all of the center lines placed under this method are said to be in good condition.

This method of placing center line stripes, which was developed by J. D. French, concrete paving engineer, in collaboration with J. Douglas, construction engineer, both of the Texas Highway Department, consists of impregnating the fresh concrete with black coloring pigment such as magnetic iron oxide. To confine coloring material to the desired area, the contractor works from a bridge 5 to 8 ft. in length made of steel pipe or small I-beams, mounted on wheels which run



PERMANENT CENTER LINE STRIPE made by impregnating magnetic iron oxide into green concrete.

PAVING OPERATION IN PROGRESS showing relative distance between center line bridge and paver. One workman can easily keep up with paving crew.

"Going Good

and making GOOD MONEY for us",
says W. C. White & Son, Dayton, Ohio about their

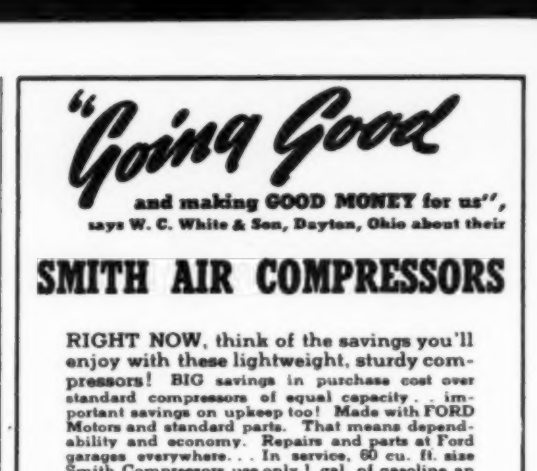
SMITH AIR COMPRESSORS

RIGHT NOW, think of the savings you'll enjoy with these lightweight, sturdy compressors! BIG savings in purchase cost over standard compressors of equal capacity . . important savings on upkeep too! Made with FORD Motors and standard parts. That means dependability and economy. Repairs and parts at Ford garages everywhere. . . In service, 60 cu. ft. size Smith Compressors use only 1 gal. of gasoline an hour! Easily portable—tow them from job to job at permissible truck speeds. No couplings, belt, clutch or gears to wear and give trouble. Head equipped with high speed compressor valves; automatic unloading and idling. . . Write today for complete catalog that gives you the facts!

With a Ford Motor and shop facilities you can assemble your own Smith Compressor. We will furnish a Smith Compressor Head and Accessories with complete instructions for mounting.

Write for FREE booklet
GORDON SMITH & CO.
480 College St., Bowling Green, Ky.

COFFING *Safety Pull* **HOISTS**

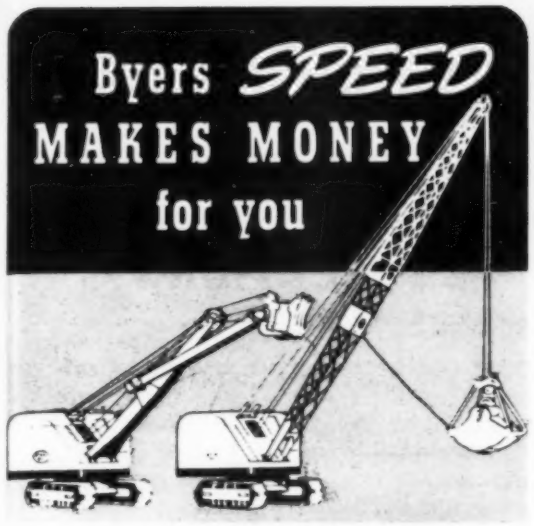


MORE PROFIT LESS MAINTENANCE...
when they're on the job . . .

Here's a one-man tool that can do a hundred and one jobs on any construction project. One man and a Coffing Safety-Pull can lift, pull, move, and do many emergency and repair jobs. When used in batteries they exert powerful uniform action that makes them invaluable for certain kinds of construction work. Let us send you circulars telling all about Coffing Safety-Pull Hoists — their safety features — their efficiency — their easy portability — their low first cost.

WRITE FOR CATALOG CMG-4

COFFING HOIST COMPANY
DANVILLE **ILLINOIS**



"Speed" is the word on today's construction! Speedy completion of your job requires equipment capable of more than ordinary speed.

You won't have to knock the governor off the motor of any Byers to get all the speed in digging, dumping, travelling, swinging that your operator can safely use.

This is another reason why you should investigate Byers ⅜ to ¾ yd. shovels and cranes.

11 FULLY CONVERTIBLE MODELS
IN 3/8-1/2-5/8-3/4 YD. SIZES

Modern CRANES and SHOVELS

BYERS

RAVENNA, OHIO

BETTER RESULTS
with
STERLING

There's a reason why the largest contractors select Sterling Construction Equipment for their most important jobs. Contractors everywhere have found they can do more work at less cost with Sterling Construction Equipment because Sterling's Fully Developed, Thoroughly Tried and Proven Design assures **Dependable Performance.**

HOISTS • PUMPS • SAW RIGS • LIGHT PLANTS

Write for Literature and Prices

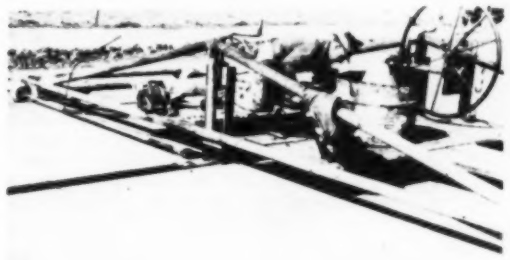
STERLING MACHINERY CORP.

405-13 Southwest Blvd. Kansas City, Mo.

on the steel side forms and propelled by manually operated levers. From the center of the bridge are suspended two steel channels placed 6 in. apart to serve as a guide in determining the center line. The edges that come in contact with the concrete are sharpened to make a cutting edge. This center assembly may be raised or lowered by a hand wheel at each end.

The guides are first lowered until they come in contact with the surface of the green concrete. The area between the guides then is roughened with a hand rake, after which iron oxide is blown on the surface with a lime duster and worked into the concrete with a wooden float. Final finishing is done with steel float. Coloring material penetrates the surface of the concrete from ⅛ to ¼ in.

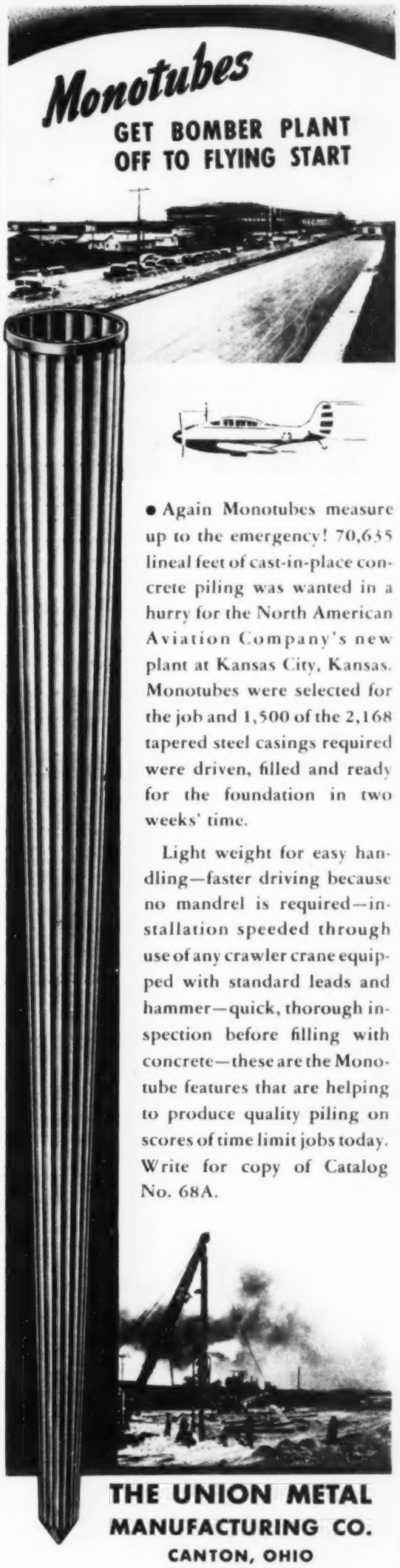
The French method of center-line striping has the following advantages over the painted line: (1) It becomes an integral part of concrete surface and therefore requires no additional maintenance; (2) any desired color may be used to provide maximum contrast; (3) is said not to get slippery in wet weather as do superficial marking materials which have oil or bituminous bases and (4) line is said to be easily distinguished from rest of pavement at night as well as in daylight.



BRIDGE SUSPENDED ABOVE PAVEMENT and running on steel side forms is propelled by manually operated levers. Workman in position and cranks for adjusting center guide knives are shown.

Cost of striping material is approximately $11 per mile as 2½ lb. of iron oxide costing 8½c. per pound is used for each 100 ft. of 6-in. stripe. On a standard paving project it requires full time service of one laborer to keep striping operations up with paving progress. Total construction cost per mile usually runs about $35.00, which includes the license fee of $4.00 per mile charged by Mr. French for use of his patent.

IRON OXIDE DUST is worked into fresh concrete with wooden float, penetrating from ⅛ to ¼ in. after final finishing with steel float.



● Again Monotubes measure up to the emergency! 70,635 lineal feet of cast-in-place concrete piling was wanted in a hurry for the North American Aviation Company's new plant at Kansas City, Kansas. Monotubes were selected for the job and 1,500 of the 2,168 tapered steel casings required were driven, filled and ready for the foundation in two weeks' time.

Light weight for easy handling—faster driving because no mandrel is required—installation speeded through use of any crawler crane equipped with standard leads and hammer—quick, thorough inspection before filling with concrete—these are the Monotube features that are helping to produce quality piling on scores of time limit jobs today. Write for copy of Catalog No. 68A.

THE UNION METAL
MANUFACTURING CO.
CANTON, OHIO

BALANCED

Equipped with Solid Rubber or Pneumatic Tire Wheels

Features:

HARD MAPLE HANDLES
INTER CHANGEABLE PARTS
WELDED TRAYS — NO RIVETS
LARGER TRAY ROD — BUTT WELDED
V-FRONT BRACES — CROSS SUPPORT
CHANNEL STEEL LEGS WITH SHOES

Where tray sheets lap, both sheets are folded around the butt-welded rod in top edge, forming double reinforcements, as shown by the cross-section at the left. This is an extra Sterling value.

STERLING WHEELBARROW CO. MILWAUKEE, WIS.

70% of All Ready-Mixed Plants

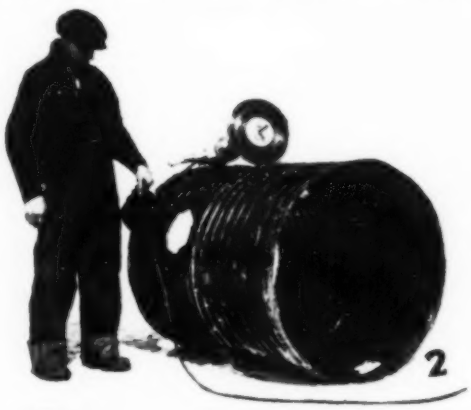
that own and operate Smith-Mobile Truck Mixers, have already come back for additional Smith-Mobiles — as many as 5, 10, 15 or even 25 units. And you can bet that the others will order more Smith-Mobiles as soon as they require additional machines. Surely, this fact is significant. Owners have learned from experience that it pays to replace the slow, old-style hatch-loading machines with faster, more efficient, more economical Smith-Mobiles. Why gamble with new, untried machines? Avoid imitations! Get the modern, time-tested Smith-Mobiles. Ask for Catalog No. 198-A.

THE T. L. SMITH COMPANY • 2851 N. 32nd St • Milwaukee, Wis.

Saw Cuts Holes

FOR SEWER PIPE CONNECTIONS

HOUSE CONNECTIONS TO SEWERS of corrugated metal pipe are being made with the aid of an electric-powered saw which cuts circular holes in the sides of the conduit, as illustrated in the accompanying photographs. The cutting head of the device is rotated by an electric drill of sufficient power to handle a 1-in. bit. The process of making these house connections consists of first drilling a round hole in the Armco metal sewer pipe. A saddle



2

3

Let... "Hercules" (RED STRAND) Wire Rope Help You *Speed Up Production*

REG. U.S. PAT. OFF.

To maintain vital production schedules, it is highly important to use the kind of equipment that will give long and trouble-free service . . . *consistently.*

When it comes to wire rope, you can depend on "HERCULES" (*Red-Strand*). Proof of this is the fact that for over a period of 55 years it has been demonstrating its ability to meet the requirements of peacetime progress, as well as the demands of great emergencies. It has been able to do so because of the sound fundamental principles that have always governed its manufacture.

And this, too, is important. The same qualities and principles that make "HERCULES (*Red-Strand*) Wire Rope so long lasting . . . so dependable, also make for greater economy.

In order to be suitable for all conditions, "HERCULES" (Red-Strand) Wire Rope is made in a wide range of both Round Strand and Flattened Strand constructions — all of which can be furnished either Standard or Preformed.

Leschen Rope is distributed from over 200 different points throughout the United States, which makes for quicker deliveries. Ask us for the name and location of our Distributor in your locality.

MADE ONLY BY

A. LESCHEN & SONS ROPE CO.

WIRE ROPE MAKERS — ESTABLISHED 1857

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"HERCULES" (RED STRAND) WIRE ROPE

SAN FRANCISCO . . 520 Fourth Street
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TIME-PROVED *Head Protection* WITH COMFORT AND DURABILITY

IN EVERY MODEL

FOR EVERY JOB

M.S.A. SKULLGARDS

M. S. A. Skullgards have served the American worker with head safety and comfort for years—under all conditions of use, in every industry where head hazards exist. Hard knocks and severe exposure in all jobs and climate have clinched Skullgard's leadership as the Work Hat of Today—the *only* protective hat offering the advantages of laminated bakelite construction for higher impact-resistance, lighter weight, maximum durability, freedom from softening and non-transmittal of electricity.

Every Skullgard, from the famous Type "K" through seven different models for specific applications, provides comfort "easy on the head as an old felt hat." The reasons are *built-in*. Let us demonstrate them to you.

TYPE K. The most popular protective hat in the world—designed for all-around utility.

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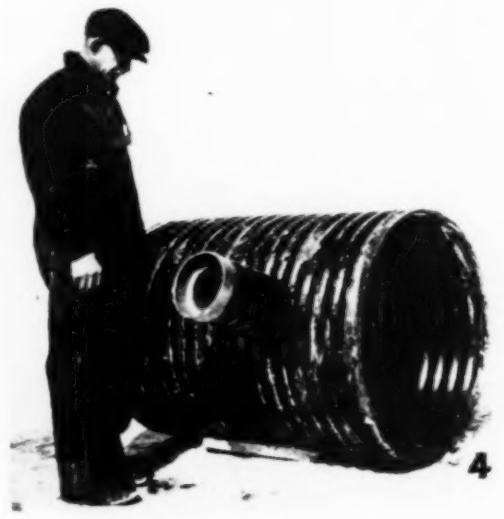
branch is then laid over this hole and bolted in place. This saddle branch consists of a segment of corrugated pipe curved to the diameter of the main line through which a hole has been cut and to which



has been welded a short stub of corrugated pipe of the required lateral diameter. The saddle is provided with bolt holes which are used for centering holes in the main line which have to be drilled.

★ ★ ★

NEWS FROM MANUFACTURERS *About Their Products*

The publications reviewed below, will keep you posted on latest developments in construction equipment and materials available for your use.

PARKWAY CABLE—**John A. Roebling's Sons Co.**, Trenton, N. J. (16 pp., illustrated) Catalog describes and lists specifications for Parkway cables laid in trench without underground duct system. Metallic and non-metallic cables in one-, two- and three-conductor types.

★ ★ ★

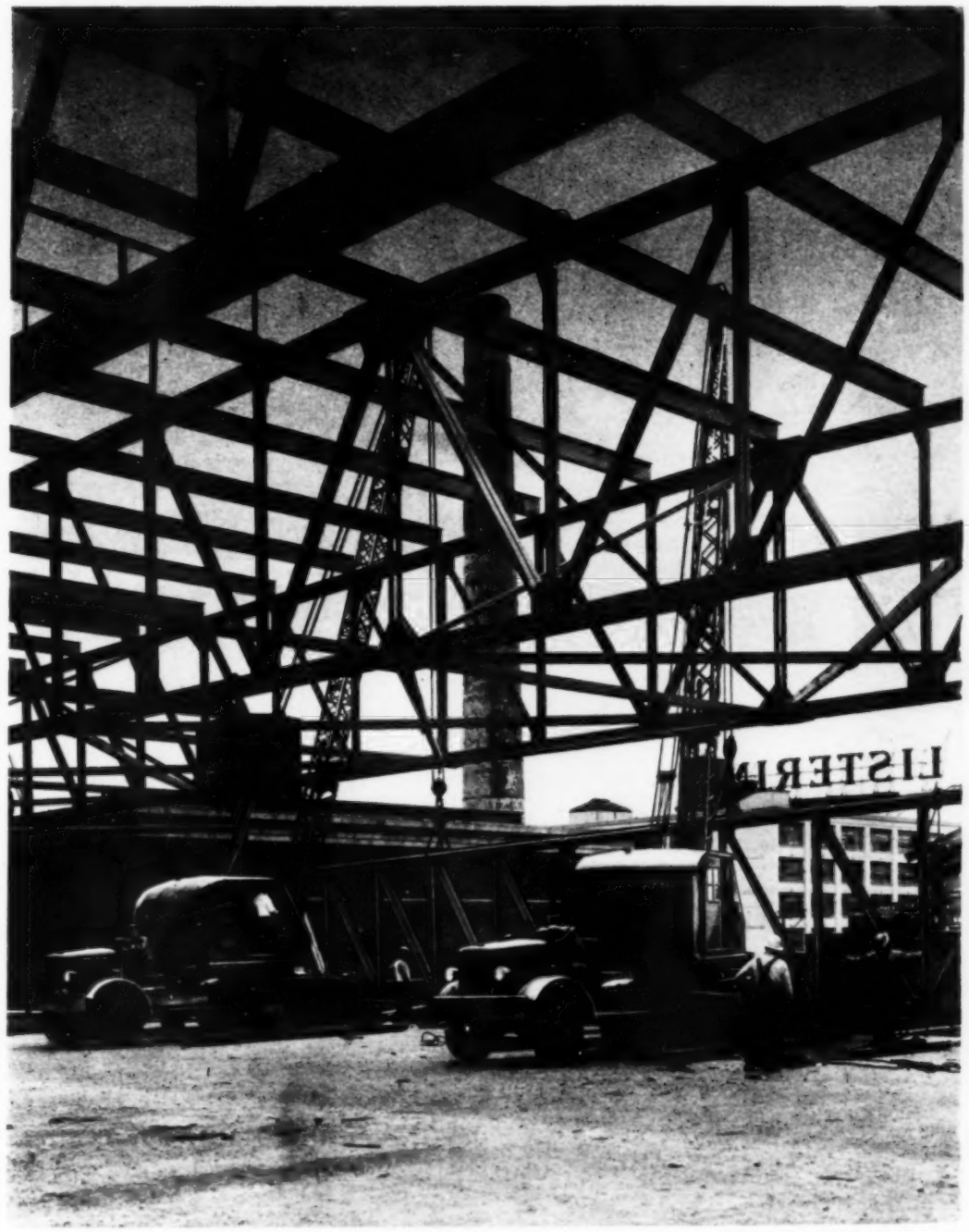
HYDRAULICALLY CONTROLLED SHOVEL — **Harnischfeger Corp.**, Milwaukee, Wis. Describes and illustrates P&H Model 855 shovel with its new hydraulic control system which is based on same principle used in automotive industry and which is said to be so responsive that operator is able to "feel" load at all times. Machine can be converted quickly from shovel to dragline, crane or clamshell.

★ ★ ★

PAINTING CREOSOTED WOOD—**Wood Preserving Corp.**, Pittsburgh, Pa. (2 pp., illustrated) Leaflet gives instructions for painting creosoted wood poles and posts with aluminum paint.

★ ★ ★

SYNTHETIC RUBBER — **Hydrocarbon Chemical and Rubber Co.**, Akron, Ohio. (8pp., illustrated) In non-technical language booklet describes physical properties of Hycar O. R. (an oil-resistant type of synthetic rubber), lists comparative properties of Hycar O. R. and natural rubber, pictures some of the steps in manufacture and relates how this synthetic product is handled like natural rubber.



★

When Time Is Precious

★

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All over the country today records for speed are being shattered in the construction of industrial buildings for defense, and in other construction work. Buildings that formerly took six months are going up in sixty days. Structures that normally require from a year and a half to two years to build are being tooled up in the record time of six to eight months.

There is a story behind this new speed in building progress. And one important chapter of it deals with time-saving mobile cranes, like the Michigan Cranes shown in the above picture, manufactured by the Ross Carrier Company.

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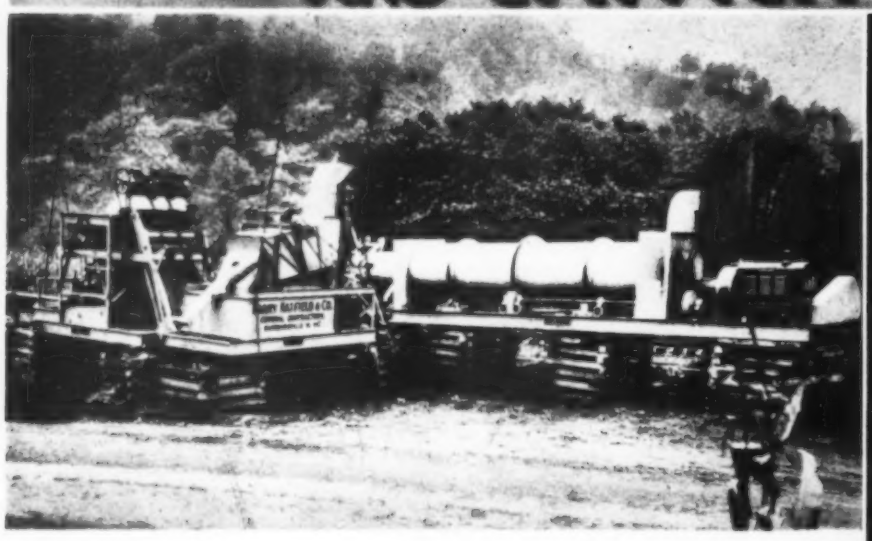

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AIR CLEANERS — **Donaldson Co., Inc.,** 666 Pelham Boulevard, St. Paul, Minn. (24 pp., illustrated.) Booklet marks 25th anniversary of company specializing in manufacture of oil-washed air cleaners for internal combustion engines on tractors, trucks and power units. Cleaners are designed to exclude dust, prevent premature wear of motor parts and increase engine life. Booklet gives history of company and illustrates manufacture of air cleaners.

★ ★ ★

PIPE JOINT—**Dresser Manufacturing Co.,** Bradford, Pa. (8 pp., illustrated) New, self-contained mechanical joint for cast-iron pipe is factory-assembled into unit for rapid installation in pipe supplied by leading manufacturers with bell ends suitable for Bellmaster joints. Booklet on Style 85 joint includes tables of sizes and pipe deflections and instructions for installing unit.

★ ★ ★

BRAKE AND CLUTCH LININGS — **Johns-Manville,** New York, N. Y. (12 pp., illustrated) Brochure of data on brake linings and blocks and clutch facings includes chart which simplifies selection of most suitable friction material for any specified service. Supplemental table makes recommendations for specific types of clutches, and final tables list characteristics of J-M friction facings, industrial linings and brake blocks.

★ ★ ★

ALUMINUM LADDERS—**Aluminum Ladder Co.,** Tarentum, Pa. (44 pp., illustrated) Catalog contains data on broad selection of aluminum ladders for industrial and commercial uses, with additional information on special ladders, scaffolding, conveyors, stages and gangways.

★ ★ ★

HYDRAULIC JACKING EQUIPMENT — **Blackhawk Manufacturing Co.,** Milwaukee, Wis. (36 pp., illustrated) Catalog No. 41-H covers hydraulic hand jacks, hand-operated hydraulic pumps and all-directional rams (combined in Port-o-Power units), gage-equipped jacks, inverted jacks, wheel floor jacks, pipe benders and various attachments for hydraulic jacking units. Includes specifications and price list.

★ ★ ★

HYDRAULIC-CONTROL BULLDOZERS—**Bucyrus-Erie Co.,** South Milwaukee, Wis. (24 pp., illustrated) Bulletin BGD—6 describes construction details and design features of hydraulic-control bulldozers and Bullgraders (latter having adjustable blades which may be angled and tilted). Booklet includes specifications on both types of equipment for four sizes of International tractors.

★ ★ ★

CABLE-CONTROL BULLDOZERS—**R. G. Le Tourneau, Inc.,** Peoria, Ill. (8 pp., illustrated) Folder A-18 presents job methods of using bulldozers and Angledozers for operations from clearing to final finishing and enumerates design features of these tractor attachments.

★ ★ ★

TERMITE PROTECTION—**Copper & Brass Research Association,** New York, N. Y. (16 pp., illustrated) Revised second edition of "Protection Against Termites With Copper Shields" discusses biology of termites, termite attacks on buildings and termite shields of barrier and deflector types. Drawings indicate correct use of termite shields in construction.

★ ★ ★

ROAD BASES—**Solvay Sales Corp.,** New York, N. Y. (20 pp., illustrated) Booklet on "Better Bases for Better Roads" contains information relating to use of calcium chloride stabilized graded aggregate mixtures for pavement bases, including Public Roads Administration test data, a comparison of roller versus shrinkage compaction as determined by shear tests, and A.A.S.H.O. specifications.

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DRILL STEEL FURNACES—**Sullivan Machinery Co.**, Chicago, Ill. (8 pp., illustrated) Bulletin No. 74-D describes two sizes of furnaces providing capacities of thirteen and 25 1¼-in. bits (ten and sixteen 2-in. bits). Units are equipped with burners and atomizers adapted to any grade of fuel oil that will flow through pipes. Special burner is furnished, when natural or artificial gas is used. Furnaces are designed to facilitate proper heating and temperature control.

★ ★ ★

WELDING PROCESS AND APPLICATIONS—**Metal & Thermit Corp.**, 120 Broadway, New York City. (36 pp., illustrated.) Describes Thermit welding process as applied to rails on railroads and street railways, to repair and reclamation of crankshafts and steel mill equipment, and to marine work, and also covers possibilities of using this method for fabrication of heavy machine parts, such as housings and frames.

★ ★ ★

CALCIUM CHLORIDE IN CONCRETE — **Calcium Chloride Association**, Detroit, Mich. (12 pp., illustrated) Bulletin No. 35 on "Cold Weather Concreting, High Early Strength and Better Concrete Curing" contains information on effects and advantages of adding calcium chloride to concrete mixtures. Data includes A.S.T.M. specifications for using calcium chloride to dry flake form, as well as in solution, covering incorporation of chemical as an admixture and its use as a surface curing agent.

★ ★ ★

MOTOR GRADERS—**J. D. Adams Co.**, Indianapolis, Ind. (Three pamphlets, all illustrated) Motor grader design, operating features, practical applications and specifications are presented in 20-p. bulletin on No. 412 motor grader with 69½-hp. diesel engine and in 8-p. booklet on No. 201 with 31-hp. gasoline engine. Separate 4-p. pamphlet describes snow plows for use with motor graders.

★ ★ ★

METAL SPRAYING — **Metallizing Co. of America, Inc.**, 562 West Washington Boulevard, Chicago, Ill. (52 pp., illustrated.) Presents history, purpose and practice of "metallizing" or metal spraying with aid of gun fed with spray wire to protect surfaces against various types of corrosion or wear and to repair or reclaim machine parts. Spray gun is lightweight device consisting of power unit and combustion unit, latter providing an oxyacetylene or oxypropane flame which reduces wire, as it is fed through nozzle of gun, to molten state. Gun nozzles handle any metals in wire form from 20 gage to ⅛ in. diameter. Wire feed control regulates speed of metal wire through gun. Among metals in wire form that can be applied by gun are carbon and stainless steels, copper, bronze, zinc, tin, lead, nickel, monel, aluminum and Swedes iron. Applications illustrated include turbine runners, overflow gate at hydroelectric plant, lock gate at dam, water tanks, stand pipes, steel bridge members, window frames, hand rails, pump rods and plungers, machine bearings, etc.

★ ★ ★

WATERPROOFING CEMENTS—**Smooth-On Mfg. Co.**, Dept. 389, 570 Communipaw Ave., Jersey City, N. J. (4-p. folder.) Tells how to waterproof and patch concrete walls; how to stop seepage from inside of cellars and cisterns; how to repair, and make ready for service in 12 hr. cracks and holes in concrete; and how to make iron-hard, dustproof and waterproof floors.

★ ★ ★

CHAIN LINK FENCING — **Anchor Post Fence Co.**, Baltimore, Md. (40 pp., illustrated.) Catalog 110 shows fourteen different models of chain link fence in various settings such as industrial plants, schools, estates, cemeteries, golf courses, and other locations throughout United States. Composite table gives pertinent information about all types and makes it easy to find. Structural details are shown by line drawings.

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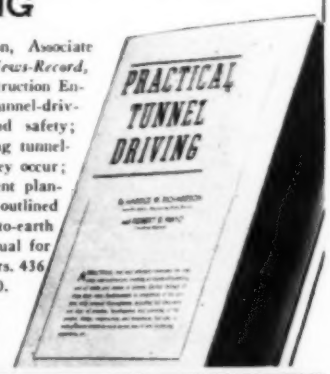

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WIRE ROPE SAFETY — **Hazard Wire Rope Division.** American Chain & Cable Co., Wilkes-Barre, Pa. (24 pp., illustrated.) Comprehensive booklet on safe use of wire rope. Gives tables of breaking strengths for all commonly used rope constructions, together with safety factors for principal rope applications. Offers constructive information on effects of acceleration, various constructions and grades of wire rope, and suggestions for correction of operating factors affecting safety such as abrasion, bending fatigue, reverse bends, kinking, spooling, crushing and corrosion. In addition booklet tells when to discard (and also how to correct) wire rope with broken and porcupined outer wires; how properly to lubricate rope; how to apply attachments and how properly to inspect wire rope. It gives tables for safe sizes of sheaves and drums, and how to calculate safe groove diameters.

★ ★ ★

APRON FEEDER—**Robins Conveying Belt Co.,** Passaic, N. J. (4 pp., illustrated) Bulletin No. 112 describes manganese steel apron feeder to handle heavy tonnages of heavy material such as rock and ore. Engineering data are given.

★ ★ ★

HEAVY-DUTY TRAILERS — **Rogers Bros. Corp.,** Albion, Pa. (30 pp., illustrated.) For moving heavy loads latest design of trailer, perfected through 25 years of experience, embodies gooseneck over wheels at front end, new low height of deck and rear wheel housing to permit easy loading, stability and low headroom clearance. Details are given on electrically welded frame, dollies, gooseneck, fifth wheel, axles, etc. Trailers are available in carrying capacities from 5 to 75 tons. Types include level deck, drop deck and rocking beam units. For all-round heavy moving service the 60-ton trailer, 8 ft. wide, has a rear end equipped with four rocking axles carrying 16 pneumatic tires. Complete dimensions and specifications for all models are given in tabulated form. Special equipment includes swinging side brackets for widening trailer 2 ft. and special goosenecks for hauling power shovels.

★ ★ ★

DESIGNING TIMBER STRUCTURES — **Timber Engineering Co.,** Washington, D. C. (22 pp., illustrated) Booklet contains information on types and uses of timber connectors, methods of computing sizes of structural members and formulas for determining stresses in members. Recommended procedure for designing timber connector structures is given in detail and illustrated by examples. Loose-leaf four-page folder inserted in booklet gives Teco connector spacing and distance charts.

★ ★ ★

GAS WELDING AND CUTTING—**Victor Equipment Co.,** San Francisco, Calif. (48 pp., illustrated) Catalog for 1941 gives information, specifications and prices of welding torches, torch butts, nozzles, tips, cutting attachments, cutting torches and tips, underwater cutting torches, cylinder trucks, pressure regulators, manifolds and other equipment used in gas welding and cutting.

★ ★ ★

MALLEABLE IRON AND PROMAL ELEVATOR BUCKETS—**Link-Belt Co.,** 220 S. Belmont Ave., Indianapolis, Ind. (4-p. folder.) Covers complete price and dimensional data on elevator buckets for general service, for resistance to abrasion, for most severe service, for inclined elevators and for handling clinging and lumpy materials.

★ ★ ★

PORTABLE CRUSHING PLANTS—**Pioneer Engineering Works,** Minneapolis, Minn. (4 pp. illustrated) Bulletin describes and gives specifications for new 54-V secondary crushing plant incorporating 54-in. roll crusher, vibrating screen and return belt conveyor system, all mounted on one truck. Similar data are included for smaller 42-V plant, equipped with 40-in. roll crusher.

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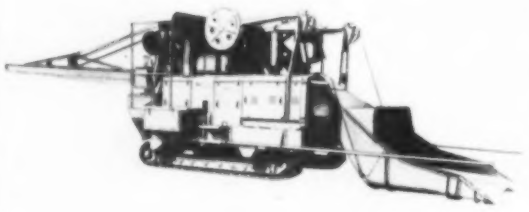

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JACKS—**Templeton, Kenly & Co.,** 1020 S. Central Ave., Chicago, Ill. (57 pp., 6⅜x3¾-in. size, illustrated.) New "junior" catalog No. 41 of vest-pocket size covers many types and sizes of Simplex screw and hydraulic jacks, with lifting capacities from 5 to 50 tons. Services for which jacks are designed include lifting, lowering, pushing, pulling and supporting. Recently revised price schedules are given. In addition to line of single-acting screw jacks there are jacks of following types: 15-20-ton emergency, 25-35-ton geared; pull-rod for oil field service; pole-pulling; pipe-pushing or pulling; cable and wire tensioning; standard speed journal; track or trip; ball-bearing; ratchet head; hydraulic.

* * *

POWER CONTROL UNIT—**J. D. Adams Co.,** Indianapolis, Ind. (2 pp., illustrated) Leaflet describes power control unit for attachment to any crawler tractor and gives unit's special features.

* * *

POWER EXCAVATORS — **The Osgood Co.,** Marion, Ohio. (16 pp., illustrated) Catalog 4102 sets forth details of construction and design which characterize Type 80 air-control shovel, rapidly convertible to crane or dragline. Machine elements are well illustrated by photographs.

* * *

CLEANING HANDBOOK FOR TRUCK OPERATORS — **Magnus Chemical Co.,** Garwood, N. J. (50 pp., illustrated.) Tells how spraying of motors and chassis of trucks or other equipment with cold solution of Magnusol, a solvent that removes accumulations of oil, grease and muck, leaves clean metal surfaces. There is also available solution for use with steam or vapor cleaning equipment. Among problems discussed in vehicle section of book are cleaning of motors and chassis, internal motor cleaning, parts cleaning, body washing, radiator cleaning and paint stripping. There are suggestions, also, on cleaning operations in and around garages and terminals, involving concrete and composition floors, walls and driveways. Also practical advice on tank cleaning of dismantled engine parts. While handbook deals specifically with cleaning of trucks, methods and materials it discusses are, of course, applicable to all types of construction equipment powered by gasoline or diesel engines, such as tractors, cranes, power shovels, motor graders, air compressors, hoisting engines, etc. Company maintains corps of service representatives to advise on specific problems of equipment cleaning.

* * *

WOOD PRESERVATIVES — **Koppers Co.** Tar and Chemical Division, Pittsburgh, Pa., (Two folders, illustrated) Form TD-5, 4 pp., discusses use of creosote for pressure treatment of wood; Form TD-6, 2 pp., describes use of creosote-coal tar solutions for same treatment.

* * *

ROAD BUILDING MACHINERY—**White Mfg. Co.,** Elkhart, Ind. (16 pp., illustrated.) Includes line of asphalt plants, burners, material dryers, heaters, asphalt kettles, vibrators and grinders, traffic line markers, pavement repair trucks, tractor loaders and concrete mixer heaters. Asphalt plants are available in three sizes with capacities from 12 to 40 tons per hour. Vibrators are of alloy steel with abrasion resisting ribs welded on points. Asphalt and tar heating kettles are equipped with fireproof tops.

* * *

CRUSHING AND SCREENING PLANTS — **Diamond Iron Works, Inc.,** Minneapolis, Minn. (12 pp., illustrated) Catalog D-41-G offers data on portable crushing and screening plants incorporating Roto-Lift principle which makes it possible to build plants with shorter wheelbase and lower height. Design is said to reduce maintenance and power costs, as well as time and labor when moving plant. Features of various units and plant specifications are included.

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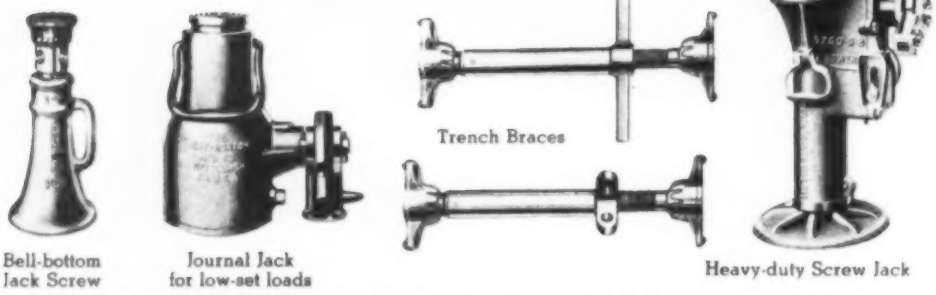

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PITTSBURGH, PENNSYLVANIA Canadian Plant: Coaticook, Quebec
"The House that Jacks Built"

VIBRATION PAVING OF CONCRETE HIGHWAYS—**Blaw-Knox Co.**, Pittsburgh, Pa. (8 pp. illustrated.) Highlight of bulletin No. 1825 is comparative description of core tests taken from vibrated and non-vibrated sections of recently paved Indiana state highway project. Compressive strength tests reveal that vibrated pavement had average strength of 6,860 lb. per square inch whereas non-vibrated pavement had average strength of 5,403 lb. per square inch. Variation in vibrated slab was 1,760 lb.; non-vibrated pavement had variation of 3,300 lb. from strongest to weakest sections.

★ ★ ★

PAVING WITHOUT PAVERS—**The Jaeger Machine Co.**, Columbus, Ohio. (24 pp. illustrated.) Describes and illustrates use of Auto-Pavers and screw spreaders in laying concrete slab and lists following advantages in using this type of equipment: (1) divides concrete plant into number of mobile units; (2) provides steady production of concrete delivered to concrete spreader for laying 10- to 14-ft. widths; (3) permits one or more units to be diverted for pouring curb, approaches and bridges without stopping work on slabs; (4) eliminates problem of 10-ft. widening where specifications ban paver from center lane; (5) successfully handles driest, harshest mixture; (6) is lowest cost method known for road widening and equally useful for other work that can be handled by truck mixers.

★ ★ ★

New Aircraft Plant

(Continued from page 65)

than 300 outlet boxes across the entire plant. These are spaced on 25-ft. centers throughout the major portion of the plant and 15 ft. apart along each of the four final assembly lines. Additional outlets are also provided on the columns and at certain overhead points.

Generous areas of sash in side walls, monitors and skylights above the center bays provide an excellent distribution of daylight, which has been controlled by the use of Aklo glass on the south and west. This illumination is matched at night by modern fluorescent lighting facilities, which reach maximum efficiency in an interior where walls and structural steel are all painted white.

★ ★ ★

Soil-Cement Construction

(Continued from page 47)

ing did not get under way until April 19, the three outfits processed from 12,000 to 16,000 sq.yd. per working day and averaged more than 13,000 sq.yd. per day for the entire project, which was completed June 7. Mixed-in-place construction was followed after the work became organized and it was found that this type of operation was flexible, economical and resulted in maximum daily production.

W. F. Scott, Thomasville, Ga., had the

(Continued on page 108)

Denver keeps pace

WITH THE RAPID GROWTH OF AMERICAN AVIATION

Adding a new Texaco Asphalt Runway to the DENVER MUNICIPAL AIRPORT

Spreading a plant-mix of Texaco Slow-curing Oil and crushed rock on runway of Denver Municipal Airport. Compacted surface is 3-inches thick.

In adding a new arm to the runway system of its Municipal Airport this year, Denver, Colo., combined serviceability and economy by constructing an Intermediate-type Texaco Asphalt surface.

Denver's newest runway has ample length and width, measuring 6100 feet by 150 feet. The surface which has a compacted thickness of 3-inches, consists of a plant-mix of Texaco Slow-curing Oil and crushed basalt rock. Supporting the surface is an 8-inch waterbound macadam base.

An impressive list of airports in all sections of the United States east of the Rockies, including Army and Navy bases and civilian fields, today are served by Texaco-surfaced runways. All types of Texaco Asphalt construction are represented, for there is a type of Texaco Asphalt runway ideally suited to the requirements of every airport.

Texaco engineers will be glad to cooperate with you in the solution of your airport runway problem. Write your nearest office.

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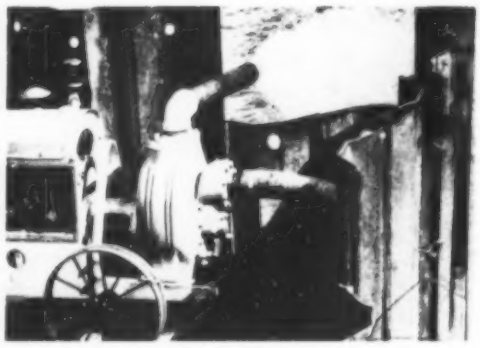
Asphalt Sales Department
135 East 42nd St., New York City

Boston
Philadelphia
Richmond
Jacksonville
Chicago
Houston

TEXACO ASPHALT

SPEED

DUAL PRIME CENTRIFUGAL PUMPS!



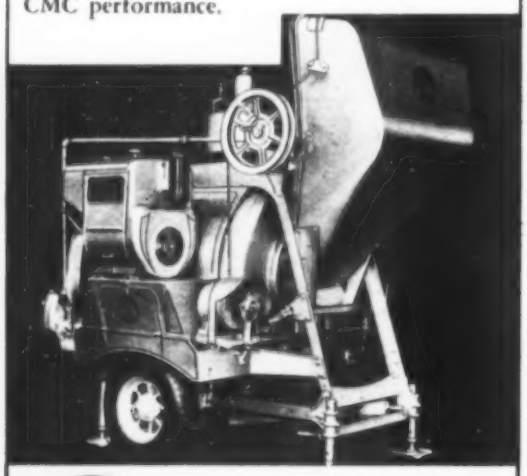
40-M CMC pumping 40,000 GPH on bridge job. A standout pump for all around service.

Doubly fast — doubly sure. Only CMC has dual prime. Sizes up to 10" — unbeatable in performance, stamina, dependability.

FAST ACTION TRAILERS

ALL SIZES UP TO 14S

Model 10S shown has air cooled V-Type Engine giving added power — with less weight. CMC offers a complete line of trailers up to 14S to meet every job need. More profits for you with "Speedmixing" CMC performance.



The newest and best in equipment to speed up construction. Concrete Mixers, Hoe-Type Mixers, Batching Equipment, Pumps, Hoists, Power Saws, Carts, Barrows.

CONSTRUCTION MACHINERY CO.
WATERLOO, IOWA

(Continued from page 106)

apron contract on an equipment-rental basis. This company averaged 5,714 sq.yd. per working day and for 15 days averaged 6,667 sq.yd.

The MacDougall Construction Co., Atlanta, Ga., built the soil-cement along one runway on a fixed-fee basis, and averaged 3,665 sq.yd. daily.

The W. L. Cobb Co., Decatur, Ga., processed the soil-cement along the second runway. Daily average of this outfit was 3,755 sq.yd.

The J. B. McCrary Engineering Corp., Atlanta, Ga., were the engineers and Col. H. L. Robb, Corps of Engineers, was in charge of the project for the U. S. Army.

* * *

Colorado River Aqueduct

(Continued from page 63)

and more evident that many other communities needed additional water from the Colorado River more acutely than Los Angeles. In 1928, therefore, there was organized the Metropolitan Water District of Southern California which now comprises the 13 cities of Los Angeles, Anaheim, Beverly Hills, Burbank, Compton, Fullerton, Glendale, Long Beach, Pasadena, San Marino, Santa Ana, Santa Monica and Torrance. The district placed at the head of its engineering and administrative organization, with the title of general manager and chief engineer, Frank E. Weymouth, formerly chief engineer of the U. S. Bureau of Reclamation. All engineering and construction work on the Colorado River Aqueduct had been carried forward and completed under Mr. Weymouth's direction just prior to his death on July 22, 1941. He is succeeded by Julian Hinds, for many years assistant chief engineer of the district.

Financed by Bond Issue

In September, 1931, the people of the 13 cities comprising the district voted a bond issue of $220,000,000 to finance the construction of the aqueduct. By late December, 1932, all preliminary legal and financing work had been completed, and the task of actually building the aqueduct was begun. From that time to June 1941, the work has gone forward without interruption. On practically all of the work on the 242-mi. main line of the aqueduct, the work proceeded 24 hr. a day in changing shifts. Supplementing the main line of the aqueduct are 150 mi. of distribution lines.

The Metropolitan Water District is a wholesaler of water to its member cities. The aqueduct delivers water to points where it is taken into the local municipally-owned water distribution systems of the various cities. Water is metered at these

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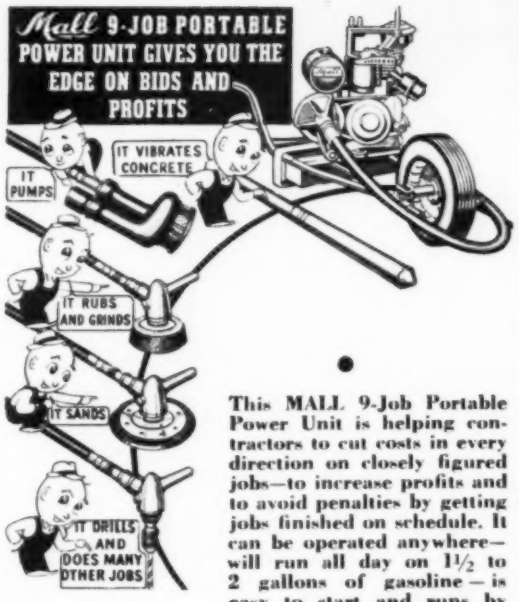
Mall 9-JOB PORTABLE POWER UNIT GIVES YOU THE EDGE ON BIDS AND PROFITS
IT VIBRATES CONCRETE
IT PUMPS
IT RUBS AND GRINDS
IT SANDS
IT DRILLS AND DOES MANY OTHER JOBS

This MALL 9-Job Portable Power Unit is helping contractors to cut costs in every direction on closely figured jobs—to increase profits and to avoid penalties by getting jobs finished on schedule. It can be operated anywhere—will run all day on 1½ to 2 gallons of gasoline—is easy to start and runs by itself. In addition, it furnishes driving power for Concrete Vibrating, Concrete Surfacing, Form Sanding, Sawing with Circular or Chain Saw, Grinding, Drilling, Wire Brushing, Pumping and Sharpening Tools or Bits! The swivel-fitted, interchangeable attachment feature makes it possible to change tools in a jiffy. A Free Demonstration enables you to try before you buy.

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★★ We make over 200 gasoline engine, air and electrically operated tools and attachments.

ARMSTRONG
Reversible Construction
RATCHET WRENCHES

Among big ratchet wrenches for bridge, structural and erecting work the ARMSTRONG Ratchet stands alone with its *drop forged, heat treated steel handle,* its instantly reversible ratchet and *hollow center sockets, that are machined from solid steel.* Here are the strongest, longest wearing ratchets made — there is not a casting used, and all moving parts are hardened. They are cadmium plated.

Open spindle and socket permit long bolts to pass thru wrench so nuts can be run any distance on thread, and can be quickly and securely set.

24" Ratchet takes 1" to 2 3/16" Sockets (13 sizes)

36" Ratchet takes 1⅝" to 3⅛" Sockets (11 sizes)

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ARMSTRONG BROS. TOOL CO.
"The Tool Holder People"
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Eastern Warehouse and Sales Office:
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points and the cities charged accordingly. From the moment the water enters the municipal mains it is the property and is under the control of the several cities.

Softening and Filtering Plant

Softening and filtering the Colorado River Aqueduct water supply is accomplished at one of the country's largest plants, built as an operating unit of the aqueduct's distribution system. The method employed is the lime-zeolite process. The plant has an initial capacity of 100,000,000 gal. a day, and will have an ultimate capacity of 400,000,000 gal. per day.

Included in the aqueduct's distribution system are 150 mi. of covered conduits, pipe lines and tunnels, and three reservoirs. All of the main aqueduct, with the exception of the pumping plants and a number of siphons, has been built initially to full, 1,500-cu.ft.-per-sec., or one billion gallons per day, capacity; the distribution system initially was built to half capacity.

The aqueduct project covering a total length of 392 mi., consisting of 242 mi. of main line and 150 mi. of distribution lines, includes the following construction features: 39 tunnels, totaling 109 mi.; concrete-lined canals, 63 mi.; covered concrete conduits, 54 mi.; inverted steel siphons, 29 mi.; distributing mains, 135 mi. There are 5 pumping plants on the project with a total lift of 1,617 ft. The full water-carrying capacity of the aqueduct will be about one billion gallons per day.

★ ★ ★

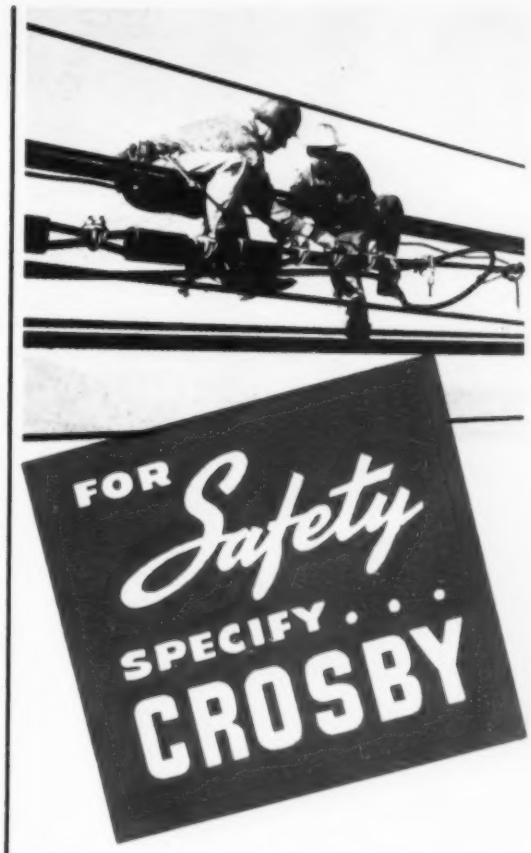
ARMY PUSHES COMPLETION OF *Southeast Air Depot*

(Continued from page 58)

completed by direct labor and by WPA forces under U. S. Engineer supervision. Not shown are eight Air Corps and Quartermaster warehouse-type buildings previously completed by the Beers Construction Co., Atlanta Ga., under a $220,000 contract. Dimensions of buildings are omitted at the suggestion of the engineers in charge.

Foundations—Unfavorable foundation conditions at the site make it necessary to use piles. All permanent structures are placed on creosoted piles varying from 25 to 75 ft. in length and averaging 50 ft. Pile loading tests were made by the engineers, using a final load of 30 tons on each test pile. The design load adopted is 15 tons per pile under all structures except the engine test units, where the load is limited to 13 tons per pile. To determine the safe

(Continued on page 110)



The two riggers shown above are working 460 feet above the Sacramento River at Shasta Dam, California. They might look like men who take long chances, but they don't. They are cool-headed, experienced and sure of themselves. They want equipment they can be sure of. They get it too for those are CROSBY CLIPS they are putting on the cableway.

Write . . .
"GENUINE CROSBY CLIPS"
when ordering wire rope clips. Then you can be sure you are safe. The word "clips" covers a lot of "cats and dogs," but the trade name "Genuine CROSBY CLIP" is real assurance of maximum safety. Standardize on the Genuine CROSBY CLIP. It's designed right for greatest grip; Drop Forged Steel; Hot dip Galvanized.

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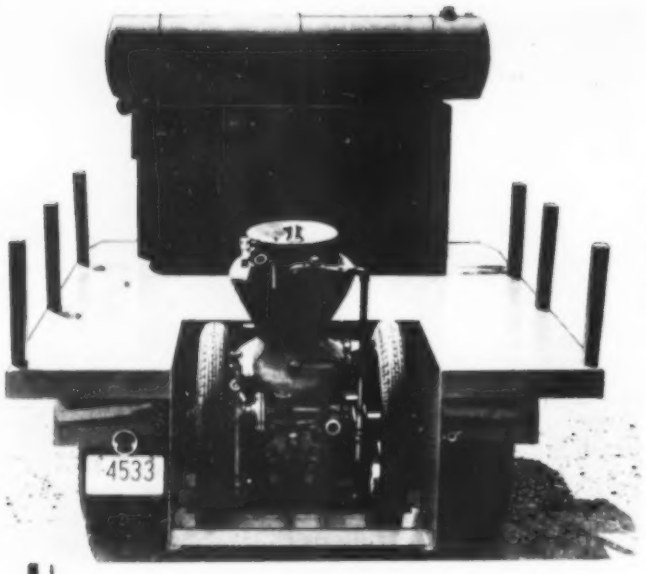

Rear view of Cretemobile showing platform and mobile cement gun unit for application of Gunite. Cement gun may be used as shown on truck or wheeled nearer to the job if desired by contractor.

HERCULES CRETEMOBILE

For Application of GUNITE!

(THE ONLY LICENSED UNIT FOR TRUCK OPERATION OF THE CEMENT GUN)

Here's a portable, compact unit especially designed for the application of Gunite which eliminates practically all set up expense for the Contractor.

On small jobs

You drive it to the job — complete the work and drive it back to your garage. It provides the only method by which small pneumatic concrete jobs can be done profitably.

On large jobs

The unit's mobility saves both time and expense. The cement gun can be removed from Cretemobile chassis and operated at any distance deemed practical by operator.

Application

The Cretemobile is used for both new construction and repair work on buildings, swimming pools, tunnels, sewers, ditches, storage tanks, etc. It may also be used as a sand blasting machine and for application of refractory materials in lining and maintaining fire boxes, furnaces, cupolas, etc.

For complete details, write for bulletin or ask for representative to call.

HERCULES STEEL PRODUCTS COMPANY

GALION · · · OHIO

Showing Cretemobile applying Gunite to an old stone structure. Note ease with which operator can apply Gunite with this mobile outfit.

(Continued from page 109)

bearing value of driven piles the engineers use the Engineering News formula for single-acting steam hammers, $P = \frac{2Wh}{s + 0.1}$, in which P is the bearing value in pounds, W is the weight of the ram in pounds, h is in height of fall of the ram in feet, and s is the average penetration in inches per blow under the final ten to twenty blows.

Despite the unfavorable character of the site, trenching for drains and sewer lines does not involve any difficult water problems, because the rate of seepage through the soil is extremely slow.

Hangar Erection

As indicated by several of the accompanying photographs, the long-span hangar frames are made up of tied, three-hinged arches pinned at the haunches and at the crown. Shop-fabricated steel members are assembled and riveted into truss sections on the ground prior to erection by crawler cranes. Haunch sections, pinned at the base, are supported on timber A-frame bents which can be raised and lowered by means of jacks to facilitate the final pin connection at the crown. Corrugated asbestos-protected metal attached to the purlins incloses the hangars.

Depot Supply Building

A U-shaped steel-frame building, comprising a two-story section at the base of the U and two long wings of mill-type construction with loading platforms facing a wide track slot down the center, will handle incoming and outgoing rail shipments and storage of supplies. This building and another steel-frame structure (marked by a flat roof and roof penthouse, cast-in-place concrete wall facing around the doorways and corrugated asbestos-protected metal siding above the steel sash in the exterior walls) are included in the Foster & Creighton contract. The latter building will house the engine repair shop.

Concrete Plants

To supply total concrete requirements of about 17,000 cu.yd. to the depot supply building and the engine repair shop, the Foster & Creighton Co. set up beside a railroad spur a central batching and mixing plant equipped with a ½-yd. Koehring mixer. Concrete was delivered from this plant to the buildings by three 1½-yd. Rex truck-mixers mounted on International trucks, hauling an average distance of about 1,500 ft. The truck-mixers delivered about 25 cu.yd. an hour to the concrete forms or to buckets handled by a crane. Because of the relatively low output of the plant, the concreting equipment operated two 8-hr. shifts per day during part of the job to keep the work up to schedule.

A volume of about 10,000 cu.yd. of concrete for the aircraft repair shop and two operations hangars is being produced by the A. J. Rife Construction Co., with a mobile, truck-mounted tower-mixer unit which can be driven close to the point of

(Continued on page 112)

In these days—would you buy a hack saw which lasted twice as long?

"Obviously—yes"—you say. "So what?"

Only this—that we are trying to point out you can find the same difference in wire rope that you do in a hack saw.

for Greater SPEED, ECONOMY and SAFETY

HAZARD LAY-SET *Preformed*

● In comparison with non-preformed wire rope Hazard LAY-SET Preformed invariably gives *much* longer and better service. That means fewer machine shutdowns -better production—more efficient operation. In short: Speed —Economy—Safety.

Hazard LAY-SET Wire Ropes will do this because they are preformed. "Preforming" is a mill process which places every wire and strand in a relaxed condition. This elimination of internal stresses within the steel gives LAY-SET extreme resistance to fatigue—and that means longer life. In addition, the preforming process makes LAY-SET resist kinking, handle easier and faster. It eliminates all necessity for seizing the ends, makes it safer for workmen to handle.

For longer rope life, fewer machine shutdowns, increased production, reduced injuries to workmen—specify Hazard LAY-SET Preformed Green Strand. All Hazard ropes identified by the Green Strand are made of Improved Plow Steel.

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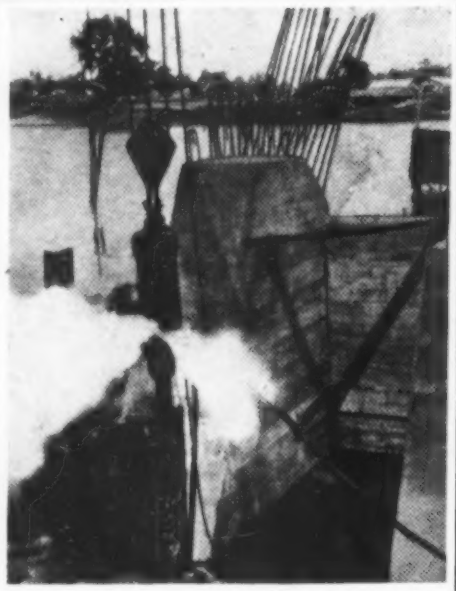

Picture shows a No. 400 Vulcan Pile Extractor pulling fifty-foot sheet piling on cofferdam. The construction engineer on this job expressed himself as being highly pleased with the performance of the Extractor.

VULCAN PILE EXTRACTORS

FOR PULLING SHEET STEEL, WOOD, CONCRETE, H-BEAM, AND PIPE PILES

Contractors operating in all parts of the country, under favorable as well as adverse conditions, since 1927 say that the Vulcan Pile Extractor justifies all claims made for its efficiency, hardiness, and rapidity of performance. Often the original cost has been repaid on a single operation. Find out how you can get new economy with a Vulcan. Made in adequate sizes for all extracting purposes—200, 400, and 800. Write for the facts.

VULCAN IRON WORKS Since 1852

331 North Bell Avenue

Chicago Illinois

(Continued from page 110)

concrete placement. Batch trucks deliver dry materials to the skip of this outfit, known as a Mixermobile, which was manufactured in Portland, Ore., and driven across the continent 3,200 mi. to the Southeast Air Depot. Equipped with power take-offs to drive a 2-yd. mixer, the mixer charging skip and the hoist tower from its Mercury V8 engine, the mobile plant can turn out a large volume of concrete. For construction of the hangars, the contractor limits the batch size to 1½ yd. and holds the output to an average of about 25 yd. an hour, as this rate is sufficient to supply hand carts wheeling concrete from the unit's tower hopper to the forms. Concrete is delivered to the hopper by a ½-yd. bucket operating in the tower, designed for extension to a maximum height of 75 ft.

Electrical Conduit

Electric power and telephone lines to serve the depot are placed underground in 50,000 lin.ft. of 3- and 4-in. Transite asbestos-cement conduit laid to drain and covered with a minimum of about 12 in. of earth. For additional protection of the conduit in the shallow trenches, creosoted timber plank is laid in the earth fill 1 to 2 in. above the asbestos-cement pipe. Under roads, the conduit is incased in concrete in addition to being protected by 2x10-in. creosoted plank buried in the fill above the concrete incasement. Ground cables paralleling the conduits are placed in the earth fill just under the creosoted timber planking. In trenches containing multiple conduits, a ground cable is used with every two or three conduits. One trench containing six electric power conduits has three ground cables.

Gas Line

Electric welding was adopted by the U. S. Engineers to speed construction of an 8-in. steel pipe line 22,500 ft. in length which brings gas into the depot from the Mobile mains of the local gas company. The pipe, delivered in 20-ft. lengths, has a ¼-in. wall thickness protected on the outside with two-ply bituminous coating and paper wrapping mechanically applied at the mill. To facilitate welding, the pipe was laid on timber stretchers bridging the trench and was welded into 100-ft. units made up of five 20-ft. lengths before final welding into a continuous line. As the first operation, the four joints in a 100-ft. section were connected with three tack welds at each joint. The V-joints then were closed by two circumferential beads, the pipe being rotated by rolling on the timber stretchers to simplify the welding operation at each joint.

For the stringer bead the welder used a 5/32-in. Fleetweld coated electrode requiring 100-amp. current. In making the final lap weld the operator changed to 7/32-in. coated electrode drawing 175 to 200 amp. The operator deposited the stringer bead in the four joints of a 100-ft. section before going back on a return trip to apply the lap weld. For the entire line, welding time averaged about 25 min. for a complete joint. A Star 50-volt 300-

COMMERCIAL

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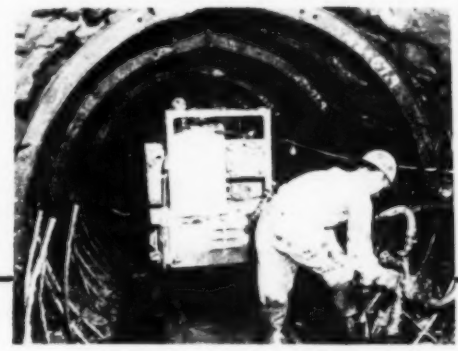
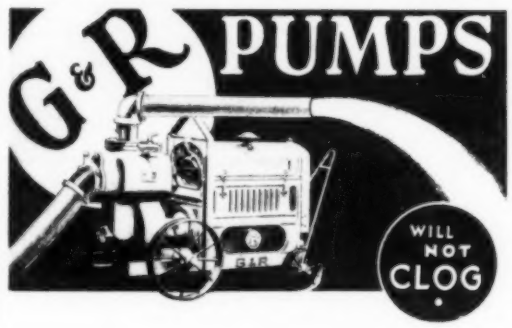
SMALL DIAMETER WATER DIVERSION TUNNELS!



● Another example of the almost unlimited uses to which COMMERCIAL Tunnel Supports can be put is illustrated here by their utilization in a small diameter water diversion shaft—the Hollywood Tunnel of the California Metropolitan Water District System. Here, speed, safety and all-around easier construction were achieved, a fact due in part to the selection of COMMERCIAL Suports for the job. *And, this same first class construction efficiency is daily being realized by contractors on other tunnels throughout the country* . . . tunnels of all sizes and shapes, in every type of ground. There's a COMMERCIAL Support ideally suited for your next tunnel job . . . write for details on sizes, types and shapes.

The COMMERCIAL SHEARING & STAMPING CO.
YOUNGSTOWN, OHIO



The Most DEPENDABLE Pump For The Least Money

Claims of fastest priming, highest suction lift, more gallons per minute, etc., do not pump water. On the job, the pump must do its own talking, and with dirty water, many a pump is inclined to stutter—and stop.

Let G & R Pumps tell you their own story on any job. They will deliver as much, and usually more, water under any condition, than any other pump. We will ship you one and let you be the judge.

Remember this about G & R Pumps—THEY WILL NOT CLOG—THEY ASK NO TIME OUT. Play safe! That is why more contractors are standardizing on G & R Pumps than on any other make.

Distributors in 100 principal cities are ready to make prompt delivery of the G & R Pumps you need.

THE GORMAN-RUPP CO. Mansfield, Ohio

THESE 2 LABELS MEAN PROTECTION OF LIFE AND PROPERTY

and SAFE-LINE WIRE ROPE CLAMPS mean you will protect your employees lives and save money by eliminating costly delays due to the biting action of old style clamps, causing the wire rope to break far below its actual strength. Insure against loss of equipment by STANDARDIZING on SAFE-LINE today. Made to fit all right lay ropes.

ELIMINATE SPLICING
OUTPULL ANY ROPE
WILL NOT FOUL
SIZES ⅛" TO ¾"

NATIONAL PRODUCTION COMPANY • 8572 ST. JEAN DETROIT, MICH.

SAFE-LINE
WIRE ROPE CLAMP

A BIG, FULL LOAD WITH EACH BITE

Because of their design and construction, Industrial Brownhoist clamshell buckets take extremely full loads with each bite, practically eliminate the need for hand shoveling, speed up material handling and cut handling costs. Quantity production plus our manufacturer-direct-to-you sales policy reduces your bucket investment. Write today.

INDUSTRIAL BROWNHOIST
BAY CITY, MICHIGAN • DISTRICT OFFICES: NEW YORK, PHILADELPHIA, PITTSBURGH, CLEVELAND, CHICAGO

amp. gasoline-powered d.c. generator supplied the current for all electric welding. Joints at pipe bends were oxyacetylene welded.

Water and Sewer Lines

With the exception of gas-main welding, performed by direct labor engaged by the U. S. Engineers, remaining operations in the construction of all underground pipe lines are executed by WPA labor under supervision of U. S. Engineer inspectors. The

SEWER TILE is laid on plank in wet bottom of sheeted trench excavated by ditching machine.

WPA crews are installing sanitary sewers 20,000 ft. in length of vitrified clay pipe, 4- to 12-in. diameter. Storm drains being laid by these forces require 18,285 ft. of pipe, 6- to 48-in. size; in general clay pipe is used up to 18-in. diameter and concrete pipe for the larger sizes. Water lines total 21,200 ft. of 4- to 12-in. cement-lined cast-iron pipe.

Grading and Excavation

To move 280,000 cu.yd. of material in grading the building area, the U. S. Engineers operated four tractor-scraper outfits: two Gar Wood 15-yd. scrapers powered by Allis-Chalmers 108-hp. diesel tractors and two LeTourneau 10-yd. units drawn by Caterpillar 70-hp. diesel tractors. In digging a large drainage ditch, the Engineers employed two of their own excavators, a Lorain 1⅛-yd. gasoline dragline and a Lorain ½-yd. gasoline shovel. All of this equipment was operated by government labor.

To utilize timber cleared from the site, the project is equipped with its own sawmill manned by WPA labor. The mill operates one steam-driven circular saw (with

(Continued on page 114)

SKILSAW
HAS
EXTRA POWER
for
EXTRA
SPEED
on all
sawing!

Jobs get done faster when you saw with SKILSAW because its overplus of power brings speed and accuracy to every cut. Now, more than ever, you need SKILSAW . . . with so many profitable jobs just waiting for builders who can do them well . . . *and finish them fast!*

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(Continued from page 113)

its log carriage) and one planer. Up to March, the sawmill had cut more than 775,000 b.-ft. of pine, in addition to smaller quantities of pecan, oak and hickory.

Development of Project

On Oct. 25, 1939, Maj. A. F. Dershimer, Quartermaster Corps, was assigned to the project to take charge of preparing a complete survey, planning the building sites, calling for bids on all large buildings and supervising construction activities. Under his direction, the land was cleared, old buildings were removed, soil borings were taken, and grading and excavation were pushed with all possible speed. Major Dershimer revised the layout of buildings originally proposed and relocated the building groups to facilitate transportation to and from railway and water terminals.

All construction at Brookley Field was transferred to the U. S. Engineers on Jan. 3, 1941, under the direction at Mobile of Lt. Col. Willis E. Teale, district engineer, assisted by Maj. G. J. Zimmerman, project engineer, and Truman A. Smith, resident engineer in charge of field work. Lt. Col. Ludson D. Worsham recently succeeded Lieutenant-Colonel Teale as district engineer.

For the U. S. Army Air Corps, Col. George S. Warren is commanding officer of Brookley Field. Outside architectural-engineering firms assisting in the design of a sewage disposal plant and temporary buildings are J. B. Converse & Co., Mobile, and A. C. Polk, Birmingham, Ala.

* * *

Belt Conveyors and Traveling Bridge

Deliver Concrete for Big Navy Drydock

(Continued from page 53)

plant located midway between the ends of the drydock and just beyond the outside face of its southerly longitudinal wall. This conveyor system delivers concrete to a movable steel bridge of 154-ft. span mounted on double-flanged wheels which ride on rails carried by a pair of 800-ft. long wood trestles, extending the full length of the drydock on either side. Power for moving the bridge along its rails is supplied by two electric motors, one at each end. On this bridge, which spans the width of the drydock and can be moved readily to any point between its ends, are transverse conveyors which receive concrete from the longitudinal shuttle con-

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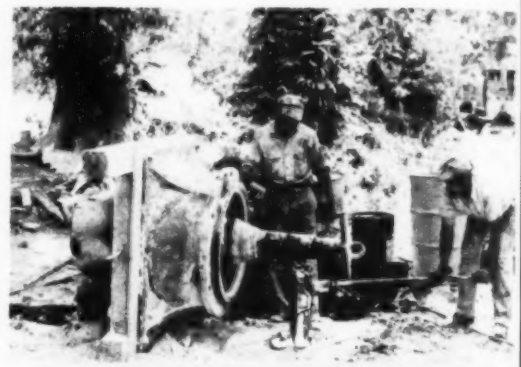

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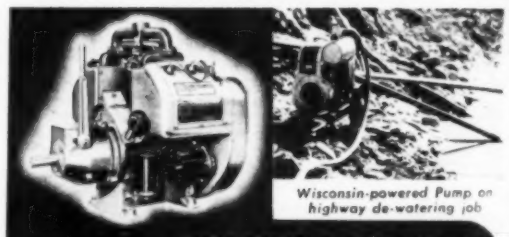

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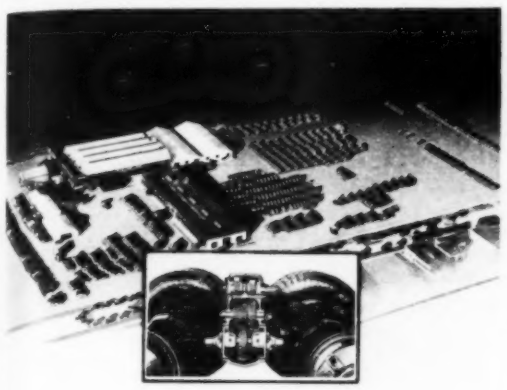

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veyor line and deliver it wherever needed to the floor slab forms.

In the main conveyor system there are four 24-in.-wide belts. The first, a stationary unit, extends from a hopper at the concrete mixing plant to a second belt extending along the south side of the dock and carried on the wood trestle that also supports one end of the transverse traveling bridge. This second belt is a reversible shuttle unit that can be moved in either direction along the trestle and is long enough to reach from the loading point opposite the mixing plant to either end of the drydock. The third belt is a fixed unit mounted on the movable steel bridge and extending from the south end to the middle of the bridge; it is fed with concrete by the longitudinal shuttle belt on the trestle and discharges on to a fourth shuttle belt, also on the bridge. This fourth belt is movable and reversible so that the concrete it receives can be discharged at any point along the length of the transverse bridge as it travels from one end of the drydock to the other. A system of interconnected control automatically shuts down all belt conveyor units if the motor on any one stops, thus preventing an accumulation of concrete at any point in the system. Other features of the belt conveyor set-up are: (1) the elimination of any traveling dumping devices on the belts by making all shuttle conveyors end-dumping units; (2) uniform loading of the belts by a special device; (3) a belt-wiping mechanism; (4) means of keeping the rolls clean.

Final delivery of the concrete into the floor slab forms is through a 16-in. steel pipe of 50-ft. maximum length, extending down from a hopper under the shuttle conveyor on the traveling bridge spanning the width of the drydock.

Mixing Plant

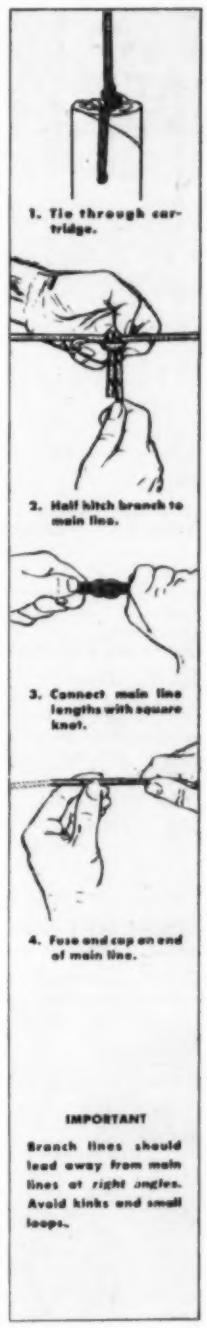
The central concrete mixing plant uses bulk cement which is delivered by trucks and fed by bucket elevator either to a small bin directly serving the batching equipment or to a large storage silo. Four sizes of aggregates are used in the concrete mix: sand and 1-, 2- and 3-in. stone. The mixers are two units, each of 3-cu.yd. capacity, which discharge into a 9-cu.yd. hopper feeding the belt conveyor delivery system through double radial gates closely controlled to insure uniform loading of concrete on the belt. Mixing time is 1½ min. per batch and as the operations of charging and discharging require only 30 sec., the complete mixing cycle consumes 2 minutes.

Preventing Belt Overload

To protect the belt from overload at its charging end a chute at the end of a 6-ft. down-spout from the hopper under the mixers is fitted on either side with flaring side boards 4 ft. high, having their lower edges extended by pieces of rubber belting that overlap the conveyor belt 6 or 7 in. on each side. As the main conveyor belt is 24 in. wide, this device restricts the concrete loading zone on the moving belt to a

(Continued on page 117)

Loading is Simplified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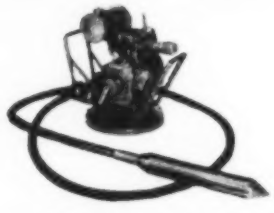

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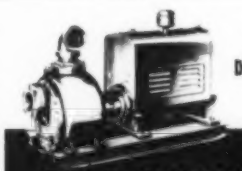

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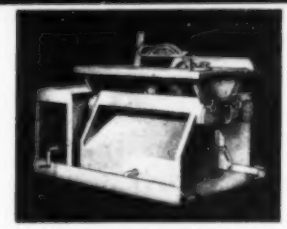

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330 West 42nd St. New York City

(Continued from page 115)

width of only 10 or 12 in. The delivery belt runs at a speed of 350 ft. per min. and has a capacity of delivering about 180 cu.yd. of concrete per hour. As the progress schedule for the job calls for the placement of about 1,000 cu.yd. of concrete per shift, the average rate of concrete delivery by the belt conveyor system is maintained at 125 cu. yd. per hour.

At transfer points, where end dumping delivers concrete between belt conveyor units, flared side boards provide storage capacity and prevent spillage. After passing over its end roll each belt is cleaned by a squeegee wiper made of a piece of belting and rigged with a counterweight to insure uniform pressure against the moving surface of the conveyor. These wipers, it has been found, are most effective when installed at a location of belt resiliency beyond, rather than directly against, the end roll, so that the belt is cleaned *after* it has passed over the roll. The cleaning work of the squeegee belt wipers is supplemented by water sprays.

On the traveling bridge which distributes the belt-conveyed concrete to the floor slab of the drydock, a hopper is rigged under the discharge end of the shuttle conveyor and from it a 16-in. steel pipe, terminating in an elephant trunk of telescopic sections, carries the concrete down into the forms. At this discharge hopper on the traveling bridge are master controls by which the operation of the entire belt conveyor system can be regulated.

Concrete pouring of the drydock floor, which has a maximum thickness of 14 ft., is done in blocks 24 ft. wide extending across the 135-ft. width of the structure. The average block unit of floor slab requires about 1,400 cu.yd. of concrete, or less than a two-shift output of the mixer plant. In these floor slab sections no construction joints are formed, the pouring being continuous across the width of the drydock. The floor slab is reinforced and the concrete, immediately after entering the forms, is consolidated with vibrators and given a rough surface finish.

The operating crew for the concrete mixing plant and belt conveyor delivery system comprises only 7 men per shift as follows: 1 man on delivery of aggregates by belt conveyor from storage piles; 1 man on hoppers of mixing plant; 1 mixer operator; 1 man controlling radial gates on hopper feeding concrete to belt conveyor; 2 men on belt conveyor patrol and repair; 1 man at belt control station on troweling bridge from which concrete is delivered to forms.

Personnel

The drydock at San Diego is being built by the Pacific Bridge Co. for the Navy's Bureau of Yards and Docks, of which Rear Admiral Ben Moreell is chief. In immediate charge of the project are Capt. J. T. Matthews, public works officer, 11th Naval District, Lieut. Comdr. Alexander Martin, resident officer, and Lieut. J. J. Albers, assistant officer in charge. For the contractor W. G. Swigert is president, T. M. Kuss, chief engineer, and Ralph T. Keenan, project manager.

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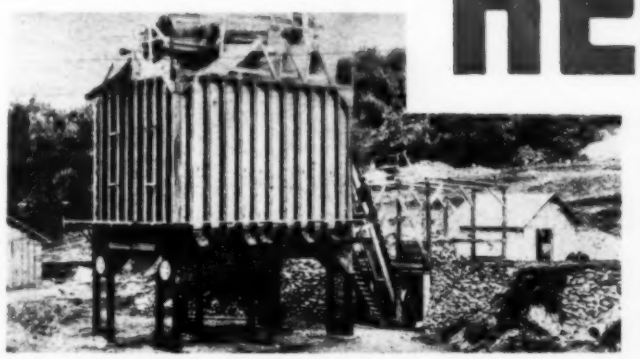

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Therefore, Construction Methods will publish a special, illustrated section devoted exclusively to "Small Tools On Construction" in the forthcoming November issue. In these pages it will picture and describe a great variety of practical applications of various types of small tools on both non-military and defense projects.

Here is a valuable addition to Construction Methods editorial service. It's designed to help construction men do a faster, better, cheaper job.

This issue can be extremely useful to other members of your organization. A limited number of extra copies will be available at 20c each.

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(Hazard Wire Rope Div.) 111
(Preformed Wire Rope Div.) 34
American Hoist & Derrick Co. 109
Ames Baldwin Wyoming Co. 84
Armco Drainage Products Assn. 87
Armstrong Bros. Tool Co. 109
Athey Truss Wheel Co. 27
Atlas Powder Co. 16
Austin-Western Road Mach'y. Co. 79

Baker Mfg. Co. 89
Barber-Greene Co. 11
Bethlehem Steel Co. 14
Black & Decker Mfg. Co., The 10
Blackhawk Mfg. Co. 68
Blaw-Knox Co. 84
Bostrom-Brady Mfg. Co. 116
Buckeye Traction Ditcher Co. 33
Bucyrus-Erie Co. 77
Byers Machine Co. 95

Calcium Chloride Ass'n 30
Caterpillar Tractor Co. 18, 19
C. H. & E. Mfg. Co. 116
Cleveland Tractor Co. ..... Center Spread
Clyde Iron Works, Inc. 92
Coffing Hoist Co. 94
Commercial Shearing & Stamping Co. .. 112
Complete Machinery & Equipment Co., Inc. 116
Construction Machinery Co. 108
Cummins Engine Co. 76

Diamond Chain & Mfg. Co. 103
Dixon Valve & Coupling Co. 114
Duff-Norton Mfg. Co. 106
Du Pont de Nemours, Inc., E. I. 24

Electric Tamper & Equip. Co. 78
Ensign-Bickford Co. 115
Euclid Road Machy. Co. 7

General Excavator Co. 6
General Motors Truck Corp. 20
Goodall Rubber Co. 88
Goodyear Tire & Rubber Co. 38
Gordon Smith & Co. 94
Gorman-Rupp Co. 112
Griffin Wellpoint Corp. 116
Gulf Refining Co. 69

Haiss Mfg. Co., Geo. 78
Harnischfeger Corp. 37
Hazard Wire Rope Division American Chain & Cable Co. 111
Heil Company, The 93
Hercules Co., The 6
Hercules Steel Pdts. Co., The 110
Hetherington & Berner, Inc. 100
Hobart Bros. Co. 116
Howe-Simpson, Inc. 116

Independent Pneumatic Tool Co. 81
Industrial Brownhoist Corp. 113
Inland Steel Co. ..... 2nd Cover
International Harvester Co., Inc. 8, 9

Jaeger Machine Co. 13

Kelley Co., Inc., E. B. 116
Koehring Company, The 67

La Plant-Choate Mfg. Co., Inc. 15
Laughlin Co., The Thomas 94
Lehigh Portland Cement Co. 22
Leschen & Sons Rope Co., A. 97
Le Tourneau, Inc., R. G. 23
Link-Belt Speeder Corp. 28
Lion Oil Refining Co. 101
Lone Star Cement Corp. 5
Lufkin Rule Co., The 102

Macwhyte Co. 85
Mall Tool Co. 109
Marmon-Herrington Co., Inc. 86
Master Builders Co., The 73
McGraw-Hill Book Co., Inc. 80, 102
Michigan Alkali Co. 108
Michigan Power Shovel Co. 82
Mine Safety Appliances Co. 98
Moretrench Corp. 35

National Production Co. 113
Northwest Engineering Co. 17

Oakite Co., Inc. 80
Osgood Co., The 6
Owen Bucket Co. 100

Page Engineering Co. 72
Preformed Wire Rope Div., American Chain & Cable Co. 34

Ramsey Mach'ry. Co. 116
Ransome Concrete Mach'y Co. 104
Roebling's Sons Co., John A. 71
Rogers Bros. Corp. 104

Schramm, Inc. 74
Searchlight Section 116
Shell Oil Co. 83
Sinclair Refining Co. 36
Skilsaw, Inc. 113
Smith Company, T. L. 96
Speedway Mfg. Co. 116
Standard Oil Co. of Calif. 25
Standard Oil Co. of Indiana 91
Sterling Machinery Corp. 95, 116
Sterling Wheelbarrow Co. 96

Templeton, Kenly & Co. 114
Texas Company, The 12, 107
Thew Shovel Co. 31
Thornton Tandem Co. 115
Timber Engineering Co. 75
Timken-Detroit Axle Co. 99

Union Fork & Hoe Co. 74
Union Metal Mfg. Co. 95
U. S. Steel Corp., Subsidiaries 32
Universal Atlas Cement Co. 32
Universal Crusher Co. 90
Universal Form Clamp Co. 118
Universal Road Mach'y. Co. 117

Vulcan Iron Works 112

Wellman Engineering Co. 90
White Mfg. Co. 116
Whiteman Mfg. Co. 26
Wickwire Spencer Steel Co. 21
Williams Company, J. H. 70
Wisconsin Motors Corp. 114
Worthington Pump & Machinery Corp. 105

WIRE ROPE SERVICE RECORD
Record of ..... Rope
Date On ..... Date Off .....
Work Accomplished .....
Lubricated (Dates) .....
Remarks .....
Record of ..... Rope
Date On ..... Date Off .....
Work Accomplished .....
Lubricated (Dates) .....
Remarks .....
Record of ..... Rope
Date On ..... Date Off .....
Work Accomplished .....
Lubricated (Dates) .....
Remarks .....
By Keeping Records—PROVE TO YOURSELF THE SUPERIORITY OF AMERICAN CABLE TRU·LAY Preformed

● One wire rope looks pretty much like another. But some ropes stand up better than others and make your buying money go farther. You can't *guess* what different ropes will do but you can easily keep a performance record. . . . Then you'll *know* what service your rope gives—how many hours or tons of work—how often replaced—and how much time lost for replacement. In short, you'll know exactly what you get for what you pay. . . . American Cable TRU-LAY Preformed Wire Rope shows up exceptionally well in comparative performance tests. It spools even, it handles easy, it reeves fast. Thanks to the preforming we give it. Yes, we like performance tests on TRU-LAY Preformed because they prove this rope extremely economical. . . . Write today for a supply of WIRE ROPE SERVICE RECORD FORMS. They are free. Their use will help increase production and lower costs. They may be used with any type or make of wire rope. And remember this—the use of TRU-LAY Preformed helps conserve the Nation's supply of steel because it gives much longer service.

AMERICAN CABLE DIVISION • **WILKES-BARRE, PENNSYLVANIA**

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AMERICAN CHAIN & CABLE COMPANY, Inc.

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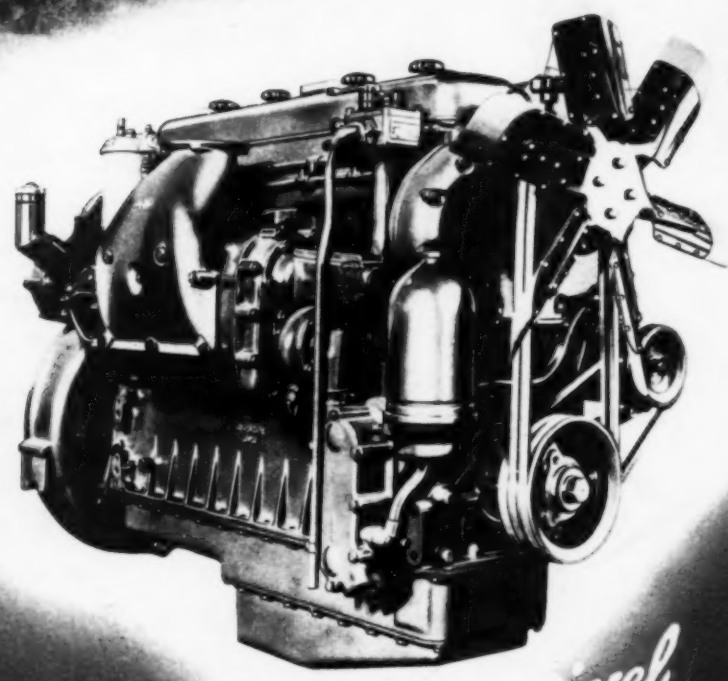
. . . A NEW KIND OF TRACTOR POWER!



There is no standing still! That is the way of progress. Remember how you used to use teams to pull your wagons and slips . . . then how you gradually turned to those things called tractors . . . outfits destined to revolutionize dirt-moving! That wasn't so long ago. Remarkable progress has been made in a comparatively few years. From teams to gas tractors . . . from gas to DIESEL. Diesel the modern power! Now 2-CYCLE . . . the MODERN DIESEL! A new kind of tractor power! A power with more zip! Operating on ordinary Diesel fuels, 2-cycle engines hang on in tough going with all the tenacity of steam power. Throttle control saves time—eliminates many gear shifting! Start instantly—no long warm-up! Many other advantages. Be a step ahead! Go modern . . . Go 2-Cycle! See your Allis-Chalmers dealer now.

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